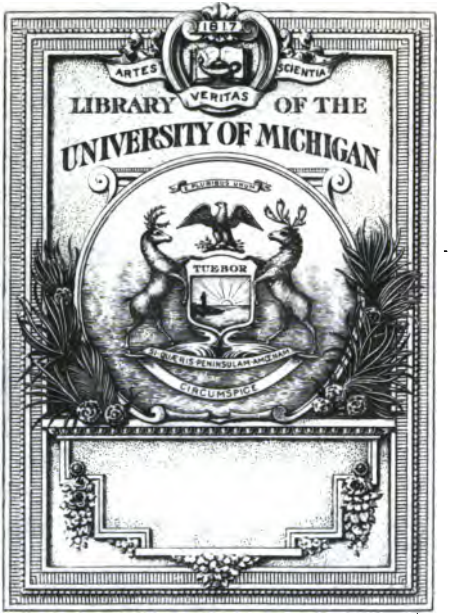

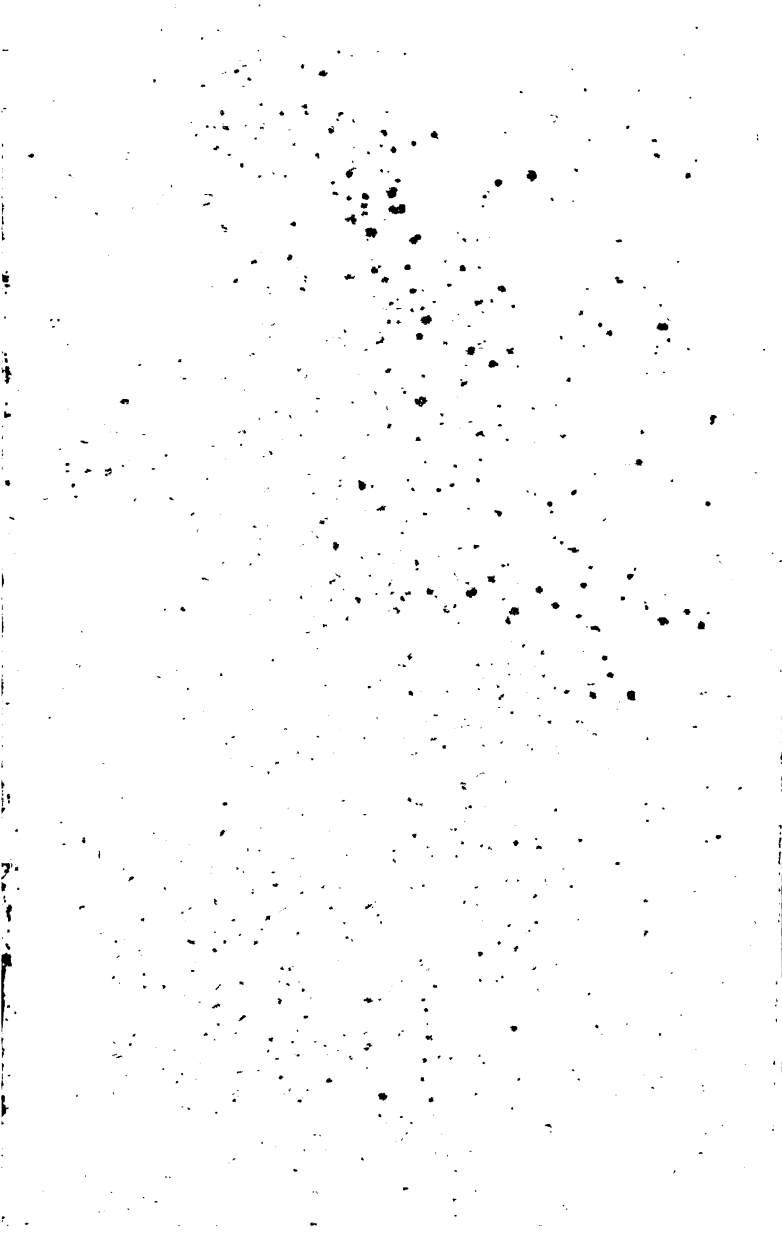

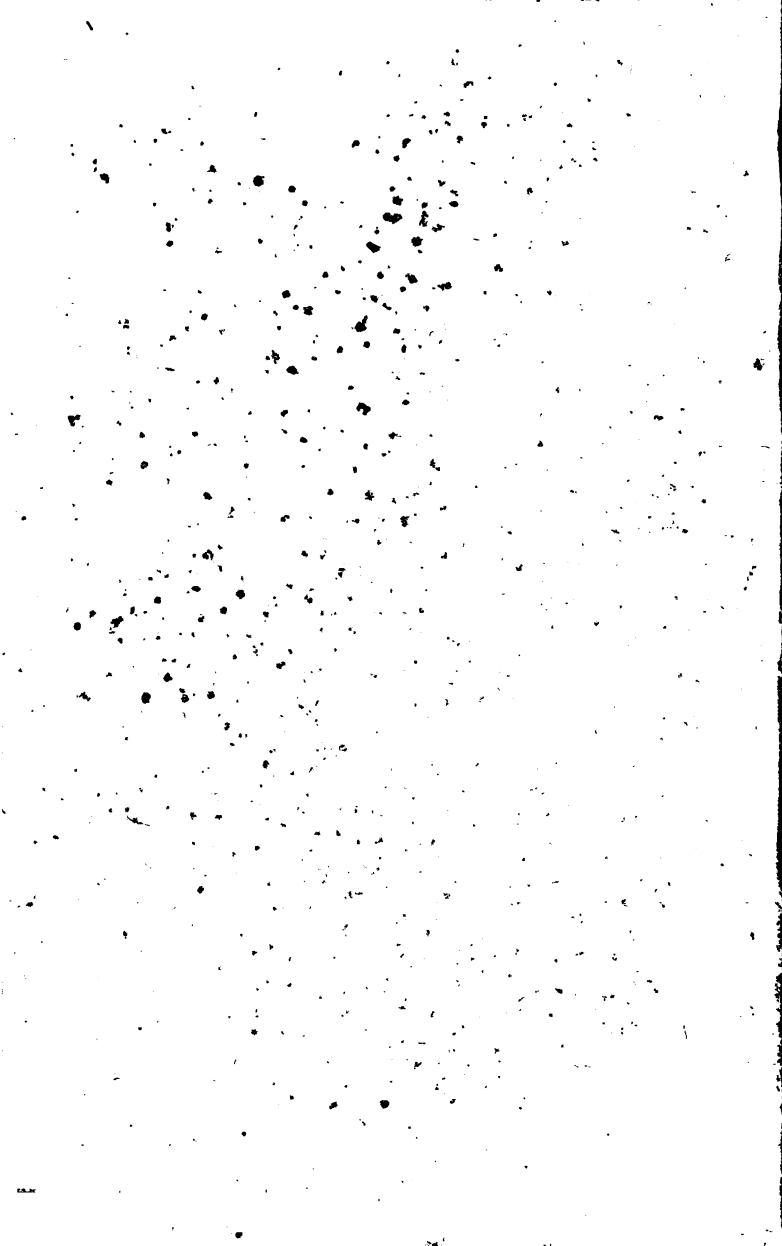

A

KEY

TO THE

American Tutor's Assistant

REVISED;

IN WHICH ALL THE

EXAMPLES

NECESSARY FOR A LEARNER

ARE

WROUGHT AT LARGE;

AND ALSO

SOLUTIONS

GIVEN OF ALL THE

QUESTIONS FOR EXERCISE

IN THE VARIOUS

RULES.

Designed principally to facilitate the Labour of Teachers, and assist such as have not the Opportunity of a Tutor's Aid.

BY FREDERIC M'KENNEY,

PRECEPTOR OF YOUTH.

PHILADELPHIA:

PRINTED BY JOSEPH CRUKSHANK.

1809.

DISTRICT OF PENNSYLVANIA, TO WIT:

BE it Remembered, That on the Tenth day of October, in the Thirty-fourth Year of the Independence of the United States of America, A. D. 1809, JOSEPH CRUKSHANK, of the said District, hath deposited in this Office, the Title of a Book, the Right whereof he claims as Proprietor, in the words following, to wit:

"A Key to the American Tutor's Assistant revised; "in which all the Examples necessary for a Learner are "wrought at large; and also Solutions given of all the "Questions for Exercise in the various Rules.....Designed "principally to facilitate the Labour of Teachers, and as- "sist such as have not the Opportunity of a Tutor's Aid. "BY FREDERIC M'KENNEY, Preceptor of Youth."

In Conformity to the Act of the Congress of the United States, entitled, "An Act for the Encouragement of Learning, by securing the Copies of Maps, Charts and Books, to the Authors and Proprietors of such Copies, during the Times therein mentioned." And also to the Act, entitled "An Act supplementary to an Act, entitled, "An Act, for the Encouragement of Learning, by securing the Copies of Maps, Charts and Books, to the Authors and Proprietors of such Copies, during the Time therein mentioned," and extending the Benefits thereof to the Arts of designing, engraving, and etching historical and other Prints."

D. CALDWELL, Clerk of the
District of Pennsylvania.

Stacks
A.
Mrs. Blanche Harvey
11-25-41

WE, whose names are underwritten, having examined a work, in manuscript, entitled, "A KEY TO THE AMERICAN TUTOR'S ASSISTANT," do highly approve of the manner in which it is performed; and from a persuasion that it is well calculated to afford a friendly aid to Teachers, in their arduous employment, as well as to young gentlemen desirous of revising their Arithmetical Studies, and who have not the opportunity of a Teacher's aid.....Do cheerfully recommend it as a Book well worthy to be encouraged, and introduced into Seminaries of Learning.

JAMES M'GINNESS, Harrisburg.
WILLIAM ALLISON, Middletown.
EDWARD M'CREA, Little Chickies.
JOSEPH JEFFERS, at Donegal Meeting-house.
PAUL BOGGS, Lancaster.
JOHN GALLIGHER, Lancaster.
T. JONES, Elizabeth-town.
NEAL M'CLOY.
JAMES DAVIS.

CONTENTS.

Explanation of Characters.

Signs.	*Significations.*
=	equal; as 20s. = £. 1
+	more; as, 6 + 2 = 8
—	leſs; as, 8 — 2 = 6
×	into, with, or multiplied by; as 6 × 2 = 12
÷	by (i. e. divided by) as, 6 ÷ 2 = 3; or, 2)6(3
: :: :	proportionalty; as 2 : 4 :: 6 : 12
$\sqrt{}$ or $\sqrt[2]{}$	Square Root; as, $\sqrt[2]{64} = 8$
$\sqrt[3]{}$	Cube Root; as, $\sqrt[3]{64} = 4$
$\sqrt[4]{}$	Fourth Root; as, $\sqrt[4]{64} = 2$, &c.
———	a Vinculum; denoting the ſeveral quantities, over which it is drawn, to be conſidered jointly as a ſimple quantity.

THE

KEY

TO THE

American Tutor's Assistant.

.....

NUMERATION.

Answers to the Examples in this Rule.

Example	(1)	106	Example (6)	251608
	(2)	538	(7)	8142006
	(3)	6074	(8)	65104090
	(4)	12510	(9)	502304000
	(5)	45601	(10)	948632751

SIMPLE ADDITION.

EXAMPLES.

(1)	1261323	(2)	3028086 75
(3)	687214855	(4)	358433426
(5)	90988481		

Application.

(1)

	5856
	3840
	395
	265
	25
	3784
ans.	14165

(2)

	1718
	99
answer	1817

(3)

on bond	807
book accounts	1047
bills and notes	86
in cash	478
answer £.	2418

(4)

the bond	4687
interest	178
amount	4865 dols.

(5)

1st purse	5784
2d do.	588
3d do.	84
4th do.	779
answer	7235 dols.

APPLICATION OF ADDITION.

(6) Nuts given 1st 357
2d 127
3d 78
4th 378
5th 57
Nuts given in all 997

(7) To his widow 3840
3 Sons { Eldest 6850, next Son 2584, next Son 2584
three Daughters { 1st dau. 1685, 2d do. 1685, 3d do. 1685
other legacies 950
answer 21863 dols.

(8)

	yds.
No. 1	367
2	367
3	407
4	407
5	407
6	228
7	228
8	228
9	300
10	300
answer	3239 yds.

(9)

	lbs.
No. 1	210
2	196
3	205
4	205
5	205
6	184
7	125
8	1274
answer	2604 lbs.

(10)

4 bales	52 pieces	1352 yds.	
3 do.	40 do.	1098 do.	
answer	92 pieces	2450 yds.	

(11)

From the creation to the flood	1650 years.
To the calling of Abraham	427
To the building of the temple	909
To the founding of Rome	266
To the birth of Christ	752
Since do.	1809
answer	5813

(12) At one o'clock it strikes 1
2
3
4
5
6
7
8
9
10
11
12

Strikes in 12 hours 78 times
+ 78

ditto in 24 hours 156 times
156
156
156
156
156
156

answer 1092 times in a week.

(13) Less number 9876
Differ. twice as many { 9876 / 9876

The greater 29628

(14) Paid at sundry times { 89 / 196 / 226 / 327

yet to pay 162

Sum 1000 dols.

SIMPLE SUBTRACTION.

EXAMPLES.

(1) 375749613
(2) 599352989
(3) 81422543
(4) 679172963.

Application.

(1) Borrowed £. 1090
Paid 909

remains 181

(2) 1809
1718

answer 91 years.

(3) From 1000
Sold 286
gave away 60
lost 437 +

Take 785

Remains 217

(4) First purse 34
Second 50
Third 100
Fourth 150

From 334 to be paid.
Take 234 paid

answer 100 dol. purse.

(5)

	Feet.
From	172
A	57
B	42
Take	99
answer	73 feet.

	lbs.		lbs.	
Bought of A	175	gross	15	tare.
	175		15	
of B	183		20	
	183		20	
	183		20	
of C	196		17	
	196		17	
	196		17	
	196		17	

From 1683 gross 158 tare,
Take 158 tare.

Rem. 1525 neat.

(7) Due to A 478 £.
Interest thereon 98

From 576

First payment 199
Second ditto 199 +

Take 398

Remains £. 178 unpaid

(8)

	Pipes	gals.
Bought	20	2459
Sold	14	1682
answer	6 pipes	777 gal.

(9) The bond £. 4700

At different payments
1478
1319
826
628

4251

Remains unpaid 449 £.

MULTIPLICATION.

CASE 1.

(1) Mul.	4513627	(2) 51473689	(3) 75134628
by	2	3	4
Product	9027254	154421067	300538512
(4)	64132579	(5) 83174268	(6) 41379462
	5	6	7
	320662895	499045608	289656234
(7)	74136982	(8) 80736014	(9) 9761436
	8	9	10
	593095856	726624126	97614360

(10) 47140651 × 11 = 518547161

(11) 273406152 × 12 = 3280873824

(12) 96478362 × 12 = 1157740344

CASE 2.

(1) Mul. 5740632 by 8 — 4×8=32

22962528 × 8 = 183700224

(2) 3740016 — 8×7=56

29920128 × 7 = 209440896

(3) 7063115 — 8×12=96

56504920 × 12 = 678059040

(4) 7034652 — 12×12=144

84415824 × 12 = 1012989888

Examples agreeably to the Note.

(1) 6782158 × 14 = 94950212

(2) 6874281 × 15 = 103114215

(3) 2816054 × 16 = 45056864

(4) 5473682 × 17 = 93052594

(5) 4785824 × 18 = 86162832

(6) 6789863 × 19 = 129007397

CASE 3.

(1) 7643827 × 23 = 22931481 + 15287654 = 175808021

(2) 8142630 × 75 = 4071315 + 5699841 = 610697250

(3) 943617|0 × 192|0 = 1887234 + 8492553 = 6681276400

(4) 376041|0
484|0

1504164
3008328
1504164

182003844000

(5) 815036|000
703|00

2445108
5705252

572970308000000

(6) 190046|0
1615|00

950230
190046
1140276
190046

306924290000

(7) 380092|0
8075|0

1900460
2660644
3040736

306924290000

(8) 6247386495
27356

37484318970
31236932475
18742159485
43731705465
12494772990

170903504957220

(9) 12494772990
13678

9995818392
8746341093
7496863794
3748431897
1249477299

170903504957220

(10) 47001881
1140090

423016929
188007524
47001881
47001881

5358637450929O

(11) 94003762
570045

470018810
376015048
658026334
470018810

5358637450929O

(12) 233926899
13679508

1871415122
1169634495
2105342091
1637488293
1403561394
701780697
233926899

3200004886285692

Application.

(1) 2564
40

answer 102560 dols.

(2) 46
5×7=35

230
7

ans. 1610=sq. feet.

(3) 9876
×6789

88884
79008
69132
59256

67048164

(4) 342 Bales
7×8=56

2394
8

19152=Pieces
5×5=25

95760
5

answer 478800=yards.

(5) B. ps.
7×11=77 ps.
29

693
154

answer 2233 yds.

(6) B. P. ps.
4× 9=36
4×12=48
Pieces=84

Ps. yds. yds.
36×27= 972
then 48×31 1488
yards 2460

(7) No. 1 & 2 each 367 × 2 = 734 Yards.
3, 4 & 5 407 × 3 1221
6, 7 & 8 228 × 3 684
9 & 10 300 × 2 600
answer 3239 yds.

(8) 13578
4938
108624
40734
122202
54312
Product 67048164 ans.

(9) 126
×109
1134
126
13734 Trees
1007
96138
13734
13830138 Apples.

(10) 52 Counties
×42
104
208
2184 Parishes
×246
13104
8736
4368
537264 Houses.
× 10
5372640 Persons.

SIMPLE DIVISION.

Short Division.

Examples.

(1) 2)7346286
Quot. 3673143

(2) 3)5112896
1704298–2 rem.

(3) 4)37612285
9403071–1

(4) 5)97036142
19407228–2

(5) 6)74830956
12471826

(6) 7)91430682
13061526

(7) 8)37846210 (8) 9)73004881 (9) 10)47390172

4730776–2 8111653–4 4739017–2

(10) 11)41036294 (11) 12)64381259 (12) 12)59436828

3730572–2 5365104–11 4953069

Examples agreeably to Note first.

(1) $18 = \begin{cases} 6)7463521 \\ 3)1243920–1 \end{cases}$ (2) $48 = \begin{cases} 6)73681090 \\ 8)12280181–4 \end{cases}$

Quotient 414640–1 rem. 1535022–34 rem.

(3) $96 = \begin{cases} 8)740043612 \\ 12)92505451–4 \end{cases}$ (4) $144 = \begin{cases} 12)57384659 \\ 12)4782054–11 \end{cases}$

7708787–60 rem. 398504–83 re.

LONG DIVISION.

EXAMPLES.

(2) 95)7461389(78540

665

811

760

513

475

388

380

89

(3) 671)5374608(8009

5368

6608

6039

569

(4) 2507)9736205(3883 Quo.

7521

22152

20056

20960

20056

9045

7521

1524

(5)

41659)756390289(18156
41659

339800
333272

6528
41659

236238
208295

279439
249954

29485

(6)

87648)9871369542(112625
87648

110656
87648

230089
175296

547935
525888

220474
175296

451782
438240

13542

(7)

175296)19742712900(112625
175296

221311
175296

460152
350592

1095600
1051776

438240
350592

876480
876480

(8)

476838)139736422224(293048
953676

4436882
4291542

1453402
1430514

2288822
1907352

3814704
3814704

(9) 293048)139736422224(476838
1172192

2251722
2051336

2003862
1758288

2455742
2344384

1113582
879144

2344384
2344384

Examples agreeably to the Note.

(1)
8146|00)83176425|00(10210
8146

17164
16292

8722
8146

Remainder 576500

(2)
16292|00)166341320|00(10219
16292

34213
32584

16292
16292

0

(3) 12749|000 87521885|000(6865
76494

110278
101992

82868
76494

63745
63745

(4) 2746|0000|35008754|0000(12749
2746
7548
5492
20567
19222
13455
10984
24714
24714

Application.

(1) 136)3264(24 miles.
272
544
544

(2) 855)4275(5 Boys
4275

(3) 186)5022(27 £. each.
372
1302
1302

(4) 1763)8435955(4785 ans.
7052
13839
12341
14985
14104
8815
8815

(5) 7969(1864746(234 answer.
15938
27094
23907
31876
31876

(6) 14 = $\begin{cases} 2 & 2072 \\ 7 & 1036 \end{cases}$
answer 148 Trees in a row.

(7)
$35 = \begin{cases} 5)670320 \text{ Yards.} \\ 7)\ 134064 \end{cases}$

$56 = \begin{cases} 7)\ 19152 \text{ Pieces.} \\ 8)\ \ 2736 \end{cases}$

answer 342 Bales.

(8)
$48 = \begin{cases} 6)15072 \\ 8)\ 2512 \end{cases}$

4)314 Gallons.

answer 78½ do. per hour

(9) 346 42904 124
346

830
692

1384
1384

(10)
$25 = \begin{cases} 5)45000 \text{ Dollars.} \\ 5)\ 9000 \end{cases}$

answer 1800 dolls each.

(11) 256 46080 180 lb. in each.
256

2048
2048

0

FEDERAL MONEY.

ADDITION.

	E.	D.	d.	c.	m.
(1)	211	9	7	2	5

	D.	c.
(2)	27955	00

	D.	c.
(3)	1110	00

	E	D.	d.	c.	m.
(4)	115	7	8	0	0

Application.

		D.	c.	m.
(1)	100	00	0	
		75	0	
	4	00	7	
	19	04	0	
answer	123	79	7	

		D.	c.	m.
(2)	An English guinea	4	66	7
	A French crown	1	10	0
	One do.	1	10	0
	Spanish pistole	3	77	3
	One do.	3	77	3
	One do.	3	77	3
	answer	18	18	6

	E.	D.	d.	c.	m.
(3)	250	0	0	0	0
		9	0	0	0
			8	0	0
				6	0
					5
Facit	2509	8	6	5	

		D.	c.
(4)	Due to A	462	50
	B	365	19
	C	23	64
	D	86	92
	E	35	74
	F	84	33
	owes in all	1058	32

		D.	c.
(5)	Horse cost	125	00
	Chair	120	00
	Harness	26	45
	Saddle	16	43
	Bridle	4	16
	Whole amount	292	04

		D.	c.
(6)	In notes	1055	00
	Gold	260	00
	Silver	3650	00
	Cents	2	50
	Amount	4967	50

SUBTRACTION.

EXAMPLES.

	D.	cts.
(1)	132	22

	D.	cts.
(2)	1731	99

	D.	cts.
(3)	772	11

	D.	d.	c.	m.
(4)	6	2	2	7

	D.	c.
(5)	344	33

	E.	D.	d.	c.	m.
(6)	53	2	2	0	7

	D.	cts.
(7)	2277	84

	D.	cts.
(8)	913	05

	D.	cts.
(9)	3929	05

Application.

	D.	cts.
(1)	43	75
—	24	33
answer	19	42

	D.	c.
(2)	4967	50
—	3765	14
answer	1202	36

		D.	cts.
(3)		1965	44
Drawn for at sundry times.		960	00
		550	33
		69	29
—		1579	62
Remains		385	82

(4. Borrowed 500 44
Paid 204 56
Remains 295 88

(5) From an Eagle 10 00
Paid for Beef 1 33
Veal 1 75
Ducks 0 75 +
Butter 1 50
Vegetables 0 67
Take 6 00
Return 4 00

(6)

D.	c.	m.
4700	00	0
98	15	0
109	37	0
7	01	2
— 214	53	2
ans. 448	5	4 6 8

(7)

E.	D.	d.	c.	m.
7	5	0	0	0
	7	5	0	0
			7	5
— 7	5	7	5	
6	7	4	2	5 facit

MULTIPLICATION.

EXAMPLES.

(2) Multiply 376
by ,06
Product 22,56

(3) 5345
,08
427,60

(4) 3976
,09
357,84

(6) 268
,24
1072
536
64,32

(7) 424
,36
2544
1272
152,64

(8) 576
,48
4608
2304
276,48

D.	c.	m.
(10) 439,17		
7		
3074,19		

D.	d.	c.	m.
(11) 9	0	4	5
			29
Product 262	3	0	5

D.	d.	c.	m.
(12) 7	3	6	8
			30
221	0	4	0

Application.

(1) 456
,08
answer 36,48

(2) 896
,23
2688
1792
answer 206,08

(3) 976
2,14
3904
976
1952
Dolls. 2088,64

D.c.
(4) 6,33
34
2532
1899
Dols. 215,22

Gals.
(5) 115
,43
345
460
Dols. 49,45

(6) 6,75
6×6=36
40,50
6
Facit 243,00

D.c.
(7) 3,43
296
2058
3087
686
Dols. 1015,28

(8) 256
1,23
768
512
256
answer 314,88

lb.
(9) 3950
,29
35550
7900
Dols. 1145,50

(10) 1945 Bar.
8,25
9725
3890
15560
Dols. 16046,25

(11) 458 Bar.
3,50
22900
1374
Dols. 1603,00

DIVISION.

EXAMPLES.

2)356,56
Quotient 178,28

3)338,45
112,81⅔

4)2896,44
724,11

Dols.cts.
5)6238,44
1247,68 ⅘

Dols.cts.
7)3862,19
551,74-1

Dols.cts.
9)2384,27
264,91-8

15 = 3)6238,44 by 15
5)2079,48
415,89-9 remain.

25 = 5)2476,23 by 25
5) 495 24-3
99,04-4 } 23 rem.

33 = 3)3852,19 by 33
11)1284,06-1
116,73-3 } 10 rem.

5)2384,27 by 45
9) 476,85-2
52,98-3 } 17 rem.

52)3278,94(63,05
312
158
156
294
260
Remainder 34

56)2954,76(52,76
280
154
112
427
392
356
336
20

67)3758,39(56,09+
335
408
402
639
603
36

75)386,5,75(128,6
75
214
150
645
600
457
450
75
75

87)5798,94(66,65
522
578
522
569
522
474
435
39

Application.

(1) 4)24,32

Facit dols. 6,08

(2) D. c.m. c. m.
112 14,00,0(,12)5 answer.
112
280
224
560
560

(3) D.c.
196)7,84(,04
784

(4) D.c. c.m.
125)8,50(,06,8 per shad.
750
1000
1000

c. m.
then ,06,8
×25
340
136
answer dols. 1,70,0

(5) D. c. D.c.
34)215,22(6,33 answer.
2.0
112
102
102
102

(6) D. c. D.c.
126)189,00(1,50 ans.
126
630
630

(7) D. c.
115)49,45(,43 cents answer.
460
345
345

COMPOUND ADDITION.

EXAMPLES.

(2) £. 23957 13 5 (3) £. 20000 (4) £. 1820 19 4½

(5) £. 1806 18 1¾ (6) £. 2377 1 8¾ 7 £. 43451 18 3

(8) £. 42638 14 3¼ (9) £. 40632 12 5½

Application.

(1)
He owes in all £. 2114 1 10¾.

(2)

	£.	s.	d.
Value of the Bond	1908	17	10½
Interest of do.	191	2	1½
amount £.	2100	0	0

(3)

	£.	s.	d.
Wine cost	684	0	0
Loading &c.	17	13	8½
Storage	8	10	0
Custom	16	13	9½
Carriage	19	14	6¾
amount £.	746	12	0¾

(4)

	£.	s.	d.
Widow's use	6436	0	0
Charities	297	14	8
1st Nephew	1546	14	8
2d do.	1546	14	8
3d do.	1546	14	8
1st Niece	1324	0	0
2d do.	1324	0	0
3d do.	1324	0	0
Executor	304	0	11
£.	15649	19	7

(5)

	£.	s.	d.
First payment	13	18	9
2d do.	23	18	4¾
3d do.	47	0	9
Remainder	37	14	6½
Sum borrowed	122	12	5¼

(6)

	£.	s.	d.
1st Horse	16	17	4
2d do.	16	17	4
3d do.	16	17	4
1st Cow	5	14	7
2d do.	5	14	7
3 Bushels wheat	0	18	10½
Amount	63	0	0½

(7)

	£.	s.	d.
Brewer	42	3	3
Butcher	212	0	6
Baker	24	0	0
Chandler	13	8	0
Taylor	137	9	9
Draper	74	13	6
Rent	50	0	0
Servants wages	46	5	0
took with him	100	0	0
Draws for £.	700	0	0

(8)

	£.	s.	d.
A owes	109	19	11¾
C owes	109	19	11¾
	109	19	11¾
A & C	329	19	11¼
D as much	329	19	11¼
Sum due to B	659	19	10½

TROY WEIGHT.

EXAMPLES.

(1) lbs. oz. dwt. gr.
36 10 13 13

(2) lbs. oz. dwt. gr.
346 8 18 20

(3) lbs. oz. dwt. gr.
906 0 10 9

Application.

(1)

	lb.	oz.	dwt.	gr.	
	36	7	16	0	
	48	7	0	16	3 Ingots
	56	6	0	0	
ans. lbs.	141	8	16	16	4 do.

(2)

	lb.	oz.	dwt.	gr.
1st	9	7	14	0
2d	9	7	14	0
3d	9	7	14	0
1st	8	5	15	16
2d	8	5	15	16
3d	8	5	15	16
4th	8	5	15	16
Whole wt. lbs.	62	10	4	16

(3)

	lb.	oz.	dwt.
1st	0	7	18
2d	0	7	18
3d	0	7	18
4th	0	7	18
Spoons	4	6	0
1st	6	4	0
2d	6	4	0
3d	6	4	0
answer	26	1	12

(4)

	lb.	oz.	dwt.
14 Dishes wt.	18	3	14
36 Plates	48	1	15
6 Salts	5	7	0
4 Salvers	11	10	12
Whole wt.	83	11	1

(5)

	lb.	oz.	dwt.	gr.
1st	0	0	0	11
2d	0	0	0	11
3d	0	0	0	11
Two Basons	1	5	4	14
1st	0	2	11	0
2d	0	2	11	0
answer	1	10	7	23

(6)

	lb.	oz.	dwt.	gr.
Dishes wt.	11	4	16	11
Plates 3	11	4	16	11
times as	11	4	16	11
much	11	4	16	11
Salts	2	5	6	14
Tankards	6	7	14	17
answer	54	8	7	3

AVOIRDUPOIS WEIGHT.

EXAMPLES.

(1) T. C. qr. lb.
310 3 2 18

(2) C. qr. lb. oz. dr.
332 1 18 11 11

(3) C. qr. lb. oz. dr.
290 0 1 3 10

Application.

(1)

	C.	qr.	lb.
No. 1	9	2	18
2	8	3	12
3	7	2	19
	26	0	21

(2)

	C.	qr.	lb.	oz	dr.
No. 1	0	1	19	14	12
2	0	2	1	11	10
3	2	2	11	14	10
4	0	3	6	9	15
	4	1	12	2	15

(3)

	C.	qr.	lb.
No. 1	3	2	18
2	2	3	12
3	1	3	19
4	3	3	7
5	2	1	18
	14	2	18

(4)

	C.	qr.	lb.
No. 1	2	2	0
2	2	1	16
3	2	0	3
4	2	3	0
5	2	1	12
6	2	1	16
	14	1	19

(5)

	C.	qr.	lb.
No. 1	12	3	17
2	11	0	14
3	11	0	14
4	7	3	17
5	7	3	17
6	7	3	17
	58	3	12

(6)

	Qr.	lb.
1st Bag	2	15
2d	2	25
3d	2	25
4th	2	25
5th	2	25
6th	2	25
	4	1 0

APOTHECARIES WEIGHT.

Examples.

(1) lb. ℥ ʒ ℈ gr.
35 10 4 1 12

(2) lb. ℥ ʒ ℈ gr.
276 7 6 2 16

Application.

	℥	ʒ	℈	gr.
1st Simple	3	4	1	0
2d	4	3	2	0
3d	0	4	0	18
4th	6	5	2	18
answer oz.	15	2	0	16

LONG MEASURE.

Examples.

(1) Deg. M. fur. P.
33 51 6 34

(2) Yds. ft. in. b.c.
3458 0 10 1

Application.

From Phila. to the	M.	fur.	P.
Blue Ball	20	3	30
Red Lion	40	2	16
Harris's ferry	42	3	9
Carlisle	17	0	0
Pittsburg	201	0	2
answer	321	1	17

CLOTH MEASURE.

EXAMPLES.

(1) Yds.	qr.	na.	(2) E.F.	qr.	na.	(3) E.E.	qr.	na.
296	2	0	311	1	1	370	4	2

Application.

(1)		Yds.	qr.	na.
	No. 1	27	2	3
	2	41	3	3
	3	36	1	2
	4	33	2	1
answer yds.		139	2	1

(2)	Yds.	qr.	na.
No. 1	382	0	2
2	382	0	2
3	407	3	2
4	407	3	2
5	407	3	2
6	223	1	1
7	223	1	1
8	223	1	1
9	223	1	1
10	223	1	1
Total yds.	3104	1	3

LAND MEASURE.

EXAMPLES.

(1) A.	R.	P.	(2) A.	R.	P.	(3) A.	R.	P.
324	2	35	2844	2	27	2509	1	34

Application.

(1)	A.	R.	P.
One field	27	3	27
Another	17	3	36
A third	41	3	19
answer	87	3	2

(2)	A.	R.	P.
One wheat field	37	0	23
One rye do.	25	2	0
Two pasture fields { 1st	17	1	11
Two pasture fields { 2d	17	1	11
In meadow	21	0	14
In wood land	42	2	26
answer	161	0	5

LIQUID MEASURE.

EXAMPLES.

(1) T.	hhd.	gal.	(2) Gal.	qt.	pt.	(3) Gal.	qt.	pt.
30	2	47	3468	1	0	10195	1	1

Application.

(1)

	Gal.	qt.	pt.
1st Vessel	120	2	1
2d	258	0	0
3d	136	0	0
4th	118	1	0
answer	632	3	1

(2)

	Gal.	qt.	pt.
The 4 First hhds. each	97	1	0
	97	1	0
	97	1	0
	97	1	0
2 last each	102	3	1
	102	3	1
answer	594	3	0

DRY MEASURE.

EXAMPLES.

(1) Bu.	P.	qt.	(2) Bu.	P.	qt.	(3) Bu.	P.	qt.
347	3	5	3651	1	3	11598	2	2

Application.

(1)

Bu.	P.	qt.
14	2	5
23	3	0
8	0	7
19	1	0
59	0	4
answer 125	0	0

(2)

	Bu.	P.	qt.
4 Granaries each.	87	2	0
	87	2	0
	87	2	0
	87	2	0
2 do. each	100	0	7
	100	0	7
answer	550	1	6

TIME.

EXAMPLES.

(1) Years	m.	w.	d.	(2) Days	hr.	min.	sec.
3393	9	1	5	3166	21	48	54

Application.

(1)

1st mo.	31	da.
2d	28	
3d	31	
4th	30	
5th	31	
6th	30	
7th	31	
8th	29	
answer	241	st.

(2)

3 mo.	31	1 da.
4	30	
5	31	
6	30	
7	31	
8	31	
9	30	
10	31	
11	19	
answer	263	

	Y.	m.	w.	d.
A's age	27	5	2	0
B's	25	0	0	0
C's	20	7	3	4
D's	17	0	0	4
E's	14	11	1	0
F's	14	11	1	0
G's	12	1	0	6
answer	131	11	1	0

MOTION.

EXAMPLES.

(2) 37° 46′ 30″ (2) 9*sig.* 27° 38′ 42″

COMPOUND SUBTRACTION.

OF MONEY.

(1) £. 4818 8 $4\frac{3}{4}$ (2) £. 482 11 $10\frac{1}{4}$ (3) £. 699 3 $5\frac{1}{2}$

Application.

(1)

	£.	s.	d.
A	138	14	6
B	87	16	$4\frac{1}{2}$
answer	50	18	$1\frac{1}{2}$

(2)

	£.	s.	d.
Brewer	756	17	0
Baker	437	17	$8\frac{3}{4}$
in the baker's	318	19	$3\frac{1}{4}$

(3)

	£.	s.	d.
From	2000	0	0
1st payment	499	19	$11\frac{3}{4}$
2d do.	1388	18	11
Take	1888	18	$10\frac{3}{4}$
answer	111	1	$1\frac{1}{4}$

(4)

	£.	s.	d.
Principal	792	11	$2\frac{1}{2}$
Interest	193	12	$9\frac{3}{4}$
From	986	4	$0\frac{1}{4}$
received in part pay.	198	17	$4\frac{1}{2}$
	279	11	$7\frac{3}{4}$
	198	19	$10\frac{1}{4}$
	98	12	$9\frac{3}{4}$
Take	776	1	$8\frac{1}{4}$
remains	210	2	4 unpaid.

(5)

	£.	s.	d.
C. D's bill	75	0	0
R. Drawer's note	7	12	6
P. Johnson's do.	5	0	$0\frac{1}{2}$
Assig. on R. Dealer	17	13	9
Bank notes.	40	0	0
from 75£. deduct	70	6	$3\frac{1}{2}$
remains	£. 4	13	$8\frac{1}{2}$

(6) From £. 74 17 0=A's sum,
Take 49 13 6= differ.
answer 25 3 6=B's sum.

(7)

	£.	s.	d.
From	125111	10	6
	11000	0	0
	1111	11	11
Take	12111	11	11=Daughter's.
answer	12999	18	7=Son's.

(8)

		£.	s.	d.
He owes to	A	71	12	6
	B	34	9	9
	C	16	18	8
	D	44	0	0
	E	66	7	6
	F	11	2	3
	G	19	19	0
	H	20	0	0
From		284	9	8
Take		192	19	3
They lose		91	10	5 answer.

	£.	s.	d.
He had in cash	3	13	6
Commodities	23	10	0
Furniture	21	6	11
Tenement	56	15	0
Book debts	87	13	10
£.	192	19	3

TROY WEIGHT.

Example. (2) 29 lb. 0 oz. 6 dwt. 20 gr.

Application.

(1)

	lb.	oz.	dwt.	gr.
From	637	9	0	8
Take	288	10	9	20
	348	10	10	12

(2)

	lb.	oz.	dwt.	gr.
From	204	6	10	0
Take	108	6	1	13
	95	11	18	11

AVOIRDUPOIS WEIGHT.

(1) T. C. q. lb. 23 18 0 22 (2) T. C. qr. lb. 27 18 0 17 (3) C. qr. lb. oz. dr. 10 1 18 15 6

Application.

(1)

	C.	qr.	lb.
From	45	1	7
Take	39	0	20
Remains	6	0	15

(2)

	T.	C.	qr.	lb.
From	17	7	2	0
Take	0	12	3	9
Remains	16	14	2	19

(3)

	C.	qr.	lb.		lb.
1st Cask	1	3	12	Tare	17
2d	1	3	12		17
3d	1	3	12		17
4th	1	3	12		17
5th	1	3	12		17
6th	1	3	12		17
From	11	0	16		3 18
Take	0	3	18	tare	
answer	10	0	26		

(4)

	C.	qr.	lb.		qr	lb.
2 first hhds.	37	3	0	Tare	3	17
3d	13	2	4		1	10
4th	13	2	4		1	10
	64	3	8		1 2	9
	1	2	9	tare		

answer 63 C. 27 neat wt.

APOTHECARIES WEIGHT.

EXAMPLES.

(1) lb. ℥ ʒ ℈ gr.
2 3 1 0 13

(2) lb. ℥ ʒ ℈ gr.
11 3 4 2 2

Application.

(1)
lb. ℥ ʒ ℈ gr.
3 3 1 1 12
1 7 0 2 18
rem. left. 1 8 0 1 14

(2)
lb. ℥ ʒ ℈ gr.
From 17 11 6 2 0
First parcel 3 5 4 1 17
Second do. 3 5 4 1 17
Third do. 3 5 4 1 17
Take 10 4 5 2 11
Left 7 7 0 2 9

LONG MEASURE.

EXAMPLES.

(1) Deg. M. fur P. (2) Yds. ft. in. b.c. (3) Yds. ft. in. b.c.
2 4 6 25 175 2 5 1 76 2 3 2

Application.

(1)
L. M. fur. P. yd.
50 2 1 0 0
19 0 0 18 4
rem. 31 2 0 21 1½

(2)
M. fur. P.
1st day 21 5 0
2d 40 0 26
3d 5 4 0
B travels 67 1 26

M. fur. P.
1st day 60 0 0
2d 57 0 35
3d 52 6 0
C travels 169 6 35

M. fur. P.
Then from 327 0 0
67 1 26
169 6 35
Take 237 0 21
They are asunder 89 7 19

CLOTH MEASURE

EXAMPLES.

(1) Yds. qr. na. (2) E. F. qr. na. (3) E. E. qr. na.
27 2 3 22 1 2 66 4 3

Application.

(1)
E. E. qr. na.
From 156 0 0
Take 50 1 1
rem. 105 3 3

(2)
Yd. qr. na. in.
From 856 0 0 0
Take 200 2 1 1
rem. 655 1 2 1¼

(3) Yds. qr. na. Yds. qr. na.
27 2 3 + 27 2 3 + 27 2 3 + 27 2 3 = 110 3 0

(4) Yds. qr. na. — 87 3 0
42 + 42 + 42 = 126 0 0
yd. yd. qr. na. remains 22 3 1
42 + 27 1 2 = 69 1 2
answer 56 2 2

LAND MEASURE.

EXAMPLES.

(1) A. R. P. 67 2 28

(2) A. R. P. 63 1 3

(3) A. R. P. 325 1 19

Application.

(1) A. R. P.
From 780 2 0
Take 396 3 15
383 2 25

(2) A. R. P.
From 4780 3 30
1784 3 24 = A's
1658 2 36 = B's
Take 3443 2 20
rem. 1337 1 10 = C's

(3) A. R. P.
Bought at sundry times { 47 0 0 / 174 0 37 / 200 3 0 / 470 3 0 }
From 892 2 37
First sale 300 0 27
Second 275 0 0
Take 575 0 27
Acres 317 2 10 left.

LIQUID MEASURE.

EXAMPLES.

(1) T. hhd. gal. 7 2 22

(2) T. hhd. gal. 13 1 13

(3) Hhd. gal. qt. pt. 7 54 2 1

Application.

(1) T hhd. gal. qt.
From 2 0 0 0
Take 0 3 15 3
answer 1 0 47 1

(2) Gal. qt. pt.
From 10007 0 0
Take 4005 2 1
remains 6001 1 1

(5)

	Gal.	qt.	pt.
Bought of A	174	3	0
——of B	174	3	0
	174	3	0
	7	0	1
	531	1	1
C as much as A&B	531	1	1
	1062	3	0

then from	1062	3	1
Sold to D	197	0	1
to E	197	0	1
	197	0	1
	197	0	1
	10	3	0
Take	799	1	0
remains	263	2	0

DRY MEASURE.

EXAMPLES.

(1) Bu. P. qt.	(2) Bu. P. qt.	(3) Bu. P. qt.
18 2 5	43 2 4	273 0 5

Application.

(1) Bu. P. qt. pt.	(2) Bu. P. qt.	(3) Bu. P. qt.
From 27 1 0 0	1000 0 7	500 0 0
Take 18 2 0 1	734 1 5	375 2 6
ans. 8 2 7 1	265 3 2	124 1 2

TIME.

Examples. (1) Y. m. w. d. 809 5 1 4

(2) D. hr. min. sec. 165 23 59 59

Application.

(1) Y. m. w. d. h. min. sec.	(2) Y. m. w. d.
From 200 0 0 0 0 0 0	From 6 0 0 0
Take 98 3 0 0 8 0 10	Take 5 8 3 4
answer 101 9 3 6 15 59 50	Facit 4 0 3

(3)

	Y.	m.	w.	d.
From	14	0	0	0
	11	11	0	0
11 weeks =	2	3	0	
11 days =	0	1	4	
Take	12	1	0	4
answer	1	11	3	3

(5)

	Y.	m.	d.
From	1771	4	9
Take	1765	2	21
difference	6	1	16

(6)

	Y.	m.	d.
From	1789	10	12
Take	1787	2	22
The time	2	7	18

7)

	Y.	m.	d.		Y.	m.	d.	
From	1777	9	21	From	1778	12	25	
Take	1775	2	26	Take	1777	9	21	
Dif. of A&B	2	6	23		1	3	4	Dif. of B&C

	Y.	m	d.	
From	1778	12	25	
Take	1775	2	26	
	3	9	27	dif. of A&C. Then

Y.	m.	d.		Y.	m.	d.	
1775	2	26	+21=	1796	2	26	the time when A will be 21
1777	9	21	+21=	1798	9	21	do. for B
1778	12	25	+21=	1799	12	25	do. for C. answer.

8)

	Y.	m.	d.		Y.	m.	d.		Y.	m.	d.
From	1764	6	16	From	1790	1	1	From	1790	1	1
Take	1746	5	13	Take	1746	6	13	Take	1764	6	16
	18	0	3		43	6	18	B's age	25	6	15
Deduct	0	0	11		0	0	11				
Differ.	17	11	22		43	6	7	A's age			

MOTION.

EXAMPLES.

1) 3° 53′ 33″ (2) 3*sig.* 28° 29′ 26″ (3) 1*sig.* 29° 17′ 26″

Application.

(1)	*sig.*	°	′	″	(2)	*sig.*	°	′	″
From	7	2	17	51	From	12	0	0	0
Take	3	12	51	57	Take	9	9	9	9
Remainder	4	8	25	54	answer	2	20	50	51

COMPOUND MULTIPLICATION.

EXAMPLES.

1)

£.	s.	d.
49	12	8

(2)

£.	s.	d.
5927	13	9

(3)

£.	s.	d.
5927	13	9

4)

lb.	oz.	dwt.	gr.
19,	9	15	18

(5)

T.	C.	qr	lb.	oz.	dr.
20	13	3	9	12	13

(6)

lb.	℥	ʒ	℈	gr.
15	11	7	1	12

(7) Deg.m.fur.P.
34 34 7 20

(8) Yds. ft. in.b.c.
1127 0 10 0

(9) Yds. qr.na.
342 0 2

(10) E.E.qr.na.
276 2 0

(11) E.E.qr.na.
619 3 1

(12) A. R. P.
789 3 0

(13) T.hhd.gal.qt.pt.
54 3 6 2 1

(14) Bu. P. qt.
467 2 4

(15) Y. m. w. d.
5721 11 2 2

(16) D. hr. m.sec.
221 10 53 36

(17) *sig.* ° ′ ″
7 9 15 40

(18) *sig.* ° ′ ″
32 23 32 6

CASE 1.

EXAMPLES.

(2) Mul. by 5

s.	*d.*
7	6
1	17 6

(3)

£.	*s.*	*d.*
1	18	6
		6
11	11	0

(4)

s.	*d.*
2	10½
	3
8	7½

(2)

s.	*d.*
3	9
	10
1 17	6

(3)

s.	*d.*
19	3
	12
11 11	0

(4)

s.	*d.*
0	11½
	9
8	7½

(5)

£.	*s.*	*d.*
2	14	8 ¾
		11
30	2	0 ¼

(6)

s.	*d.*
9 11	¼
	4
1 19	9

(6)

3 3	¾
	12
1 19	9

CASE 2.

EXAMPLES.

(2) *s.* *d.*
16 at 7 10
4×4=16

1	11	4
		4
6	5	4

(2) *s.* *d.*
32 at 3 11
4×8=32

15		8
		8
6	5	4

(3) £. s. d.
27 at 1 2 10½
3×9=27
3 8 7½
9
Facit 30 17 7½

(3) £. s. d.
54 at 0 11 5¼
6×9=54
3 8 7½
9
Facit 30 17 7½

(4) £. s. d.
50 at 0 17 11. ½
5×10=50
4 9 9½
10
Facit 44 17 11

(4) £. s. d.
100 at 0 8 11 ¾
10×10=100
4 9 9½
10
Facit 44 17 11

(5) £. s. d.
66 at 7 9 6
6×11=66
44 17 0
11
Facit 493 7 0

(5) £. s. d.
132 at 3 14 9
11×12=132
41 2 3
12
Facit 493 7 0

(6) £. s. d.
72 at 9 18 11½
6×12=72
59 13 9
12
Facit 716 5 0

(6) £. s. d.
144 at 4 19 5¾
12×12=144
59 13 9
12
Facit 716 5 0

CASE 3.

EXAMPLES.

(2) £. s. d.
43 at 0 17 8×1
6×7+1=43
5 6 0
7
37 2 0
0 17 8
Fac. 37 19 8

(2) £. s. d.
86 at 0 8 10×2
7×12+2=86
3 1 10
12
37 2 0
0 17 8
Facit 37 19 8

(3) £. s. d.
58 at 0 0 $9\frac{1}{2} \times 4$
$6 \times 9 + 4 = 58$
0 4 9
9
2 2 9
0 3 2
Facit 2 5 11

(3) £. s. d.
116 at 0 0 $4\frac{3}{4} \times 8$
$9 \times 12 + 8 = 116$
0 3 $6\frac{1}{4}$
12
2 2 9
0 3 2
Facit 2 5 11

(4) £. s. d.
74 at 0 12 8×2
$9 \times 8 + 2 = 74$
5 14 0
8
45 12 0
1 5 4
Facit 46 17 4

(4) £. s. d.
148 at 0 6 4×4
$12 \times 12 + 4 = 148$
3 16 0
12
45 12 0
+1 5 4
Facit 46 17 4

(5) £. s. d.
76 at 0 15 $11\frac{1}{2} \times 1$
$7 \times 11 - 1 = 76$
5 11 $8\frac{1}{2}$
11
61 8 $9\frac{1}{2}$
— 0 15 $11\frac{1}{2}$
Facit 60 12 10

(5) £. s. d.
152 at 0 7 $11\frac{3}{4} \times 8$
$12 \times 12 + 8 = 152$
4 15 9
12
57 9 0
+ 3 3 10
Facit 60 12 10

(6) £. s. d.
78 at 8 7 0×1
$7 \times 11 + 1 = 78$
58 9 0
11
642 19 0
+ 8 7 0
Fa. 651 6 0

(6) £. s. d.
156 at 4 3 6×12
$12 \times 12 + 12 = 156$
50 2 0
12
601 4 0
+ 50 2 0
Facit 651 6 0

CASE 4.

EXAMPLES.

(2) 195 at £. s. d. 0 1 2×5

10

0 11 8×9

10

5 16 8

5 5 0

0 5 10

£. 11 7 6

(2) 390 at £. s. d. 0 0 7

10

0 5 10×9

10

2 18 4

3

8 15 0

2 12 6

£. 11 7 6

(3) 407 at £. s. d. 0 3 3×7

0

1 12 6

10

16 5 0

4

65 0 0

1 2 9

Facit 66 2 9

(3) 814 at £. s. d. 0 1 7½×4

10

0 16 3×1

10

8 2 6

8

65 0 0

0 16 3

0 6 6

Facit 66 2 9

(4) 875 at £. s. d. 0 14 3×5

10

7 2 6×7

10

71 5 0

8

570 0 0

49 17 6

3 11 3

Facit 623 8 9

(4) 1750 at £. s. d. 0 7 1½

10

3 11 3×5

10

35 12 6×7

10

356 5 0

249 7 6

17 16 3

Facit 623 8 9

(5) £. d. d.
3540 at 2 5 0
10
22 10 0 ×4
10
225 0 0 ×5
10
2250 0 0
3
6750 0 0
1125 0 0
90 0 0
Facit 7965 0 0

(5) £. s. d.
7080 at 1 2 6
10
11 5 0 ×8
10
112 10 0
10
1125 0 0
7
7875 0 0
90 0 0
Facit 7965 0 0

(6) £. s. d
286573 at 4 3 9 ×3
10
41 17 6 ×7
10
418 15 0 ×5
10
4187 10 0 ×6
10
41875 0 0 ×8
10
418750 0 0
2
837500 0 0
335000 0 0
25125 0 0
2093 15 0
293 2 6
12 11 3
Facit 1200024 8 9

Application.

EXAMPLES.

(1) £. s. d.
1 11 5
9
ans. 14 2 9

(2) s. d.
9 6
12
£. 5 14 0

(3) £. s. d.
1 14 6
6×7=42
10 7 0
7
£. 72 9 0

(4) s. d.
18 11½
9
8 10 7½
11
£. 93 16 10½

(5) s. d.
13 4
12×12=144
8 0 0
12
£. 96 0 0

(6) s. d.
7 10×1
6×10−1=59
2 7 0
10
23 10 0
— 0 7 10
£. 23 2 2

(7) £. s. d.
1 2 3×7
10×11+7
11 2 6
11
122 7 6
+ 7 15 9
£. 130 3 3

(8) s. d.
6 8×8
10
3 6 8×9
10
33 6 8
30 0 0
2 13 4
£. 66 0 0

(9) £. s. d.
1 2 6×5
10
11 5 0×7
10
112 10 0
2
225 0 0
78 15 0
5 12 6
£. 309 7 6

(10 s. d.
2 5
10
1 4 2
10
12 1 8
3
36 5 0
3 12 6
0 14 6
£. 40 12 0

(11)

	s.	d.	
	0	$11\frac{3}{4}$	
		10	
	9	$9\frac{1}{2}$	$\times 5$
		10	
	4	17	11
		3	
	14	13	9
	2	8	$11\frac{3}{4}$
£.	17	2	$8\frac{1}{2}$

(12)

£.	s.	d.	
3	8	$11\frac{1}{4}$	$\times 9$
		10	
34	9	$4\frac{1}{2}$	$\times 3$
		10	
344	13	9	
		7	
2412	16	3	
103	8	$1\frac{1}{2}$	
31	0	$5\frac{1}{4}$	
£. 2547	4	$9\frac{3}{4}$	

(13)

	s.	d.	
	15	3	
			$4\times 6=24$
3	1	0	
		6	
£. 18	6	0	

(14)

	s.	d.	
	5	6	
			$9\times 11-1=98$
2	9	6	
		11	
27	4	6	
—	0	5	6
£. 26	19	0	

(15)

	s.	d.	
	0	$7\frac{1}{2}$	$\times 2$
		10	
	6	3	$\times 7$
		10	
3	2	6	
		6	
18	15	0	
2	3	9	
0	1	3	
£. 21	0	0	

(16)

	s.	d.	
	14	6	
		10	
7	5	0	$\times 4$
		10	
72	10	0	
		2	
145	0	0	
29	0	0	
£. 174	0	0	

(17)

£.	s.	d.	
1	12	6	$\times 5$
		10	
16	5	0	$\times 6$
		10	
162	10	0	
		3	
487	10	0	

then

487	10	0	
97	10	0	
8	2	6	
593	2	6	
294	12	6	
£. 887	15	0	

(18)

	d.	*s.*	*d.*
18=	1	6	×4
		10	
	15	0	×4
		10	
	7	10	0 ×3
		10	
	75	0	0
	22	10	0
	3	0	0
	0	6	0
£.	100	16	6

(19)

	s.	*d.*	
	7	6	×5
	10		
3	15	0	×6
	10		
37	10	0	
		3	
112	10	0	
22	10	0	
1	17	6	
£. 136	17	6	

(20)

w. d.	*d.*	*s.*	*d.*	
52×6+1=	313	at 2	6	×3
		10		
	1	5	0	×1
		10		
	12	10	0	
			3	
	37	10	0	
	1	5	0	
	0	7	6	
£.	39	2	6	

(21)

	s.	*d.*	
	12	6	
		10	
6	5	0	
		10	
62	10	0	
		10	
answer £.	625	0	0

(22)

	s.	*d.*	
	19	11	×5
	10		
9	19	2	×6
	10		
99	11	8	
		3	
298	15	0	
59	15	0	
4	19	7	
£. 363	9	7	

	£.	*s.*	*d.*
From	500	0	0
Take	363	9	7
Lays up	136	10	5

Note. The answer to the 23d and such like questions, may be more concisely obtained, by deducting the prime cost of 1lb. &c. from the selling price, and multiplying the remainder by the quantity: the product will be the gain on the whole.

(23)

	s.	d.
504×6=3024 at	0	8¼×4
	10	
	7	1×2
	10	
	3 10	10
	10	
	35 8	4
		3
	106 5	0
	14	2
	2	10
Bought for	107 2	0

	s.	d.
again 3024 at	0	9¼×4
	10	
	7	8½×2
	10	
	3 17	1
	10	
	38 10	10
		3
	115 12	6
	0 15	5
	0 3	1
Sold for	116 11	0

	£.	s.	d.
From	116	11	0
Take	107	2	0
gained	9	9	0

(24)

	s.	d.
20×25=500 at	2	7¾
	10	
	1 6	3
	10	
	13 2	6
		5
Prime cost	65 12	6

	s.	d.
500 at	2	10½
	10	
	1 8	9
	10	
	14 7	6
		5
Sold for £.	71 17	6
—	65 12	6
Gained	6 5	0

COMPOUND DIVISION.

EXAMPLES.

(1) £. 36 18 8

(2) £. 3288 19 11¼

(3) £. 1921 8 5

(4) £. 1951 19 3¾

(5) lb.oz.dwt.gr. 8 4 15 14

(6) T C. qr.lb. 15 6 0 13⅜

(7) lb. ℥ ʒ ℈ gr. 1 4 7 2 8⅞

(8) Deg.M.fur.P. 5 13 4 39⅜

(9) Y.ft in.b.c. 2 0 3 1⅝

(10) Yds.qr.na. 6 3 0 6/16

(11) A. R.P. 162 1 32 1/12

(12) T.hhd.gal.qt. 2 1 17 3 2/5

(13) Bu. P. qt.
39 2 7 $\frac{10}{12}$

(14) Y. m. w. d.
299 8 1 6 $\frac{5}{6}$

(15) D. hr. min. sec.
1 17 53 5

(16) *Sig.* ° ′ ″
1 13 51 7

CASE 1.

EXAMPLES.

(2) £. s. d.
5)1 8 4
Quoti. 0 5 8

(3) £. s. d.
7)3 19 9 $\frac{1}{4}$
0 11 4 $\frac{3}{4}$

(4) £. s. d.
9)4 8 6
0 9 10

(5) £. s. d.
10)3 15 0
0 7 6

(6) £. s. d.
11)9 17 9 $\frac{1}{4}$
0 17 11 $\frac{3}{4}$

(7) £. s. d.
6)11 11 3
1 18 6 $\frac{1}{2}$

(8) £. s. d.
12)23 2 6
Facit 1 18 6 $\frac{1}{2}$

CASE 2.

(2) £. s. d.
3)3 10 10 $\frac{1}{2}$
9)1 3 7 $\frac{1}{2}$
0 2 7 $\frac{1}{2}$

(3) £. s. d.
7)52 10 0
8) 7 10 0
0 18 9

(4) £. s. d.
8)372 16 0
12) 46 12 0
3 17 8

(5) £. s. d.
10)225 0 0
12) 22 10 0
1 17 6

(6) £. s. d.
8)474 0 0
9) 59 5 0
6 11 8

(7) £. s. d.
12)948 0 0
12) 79 0 0
6 11 8

CASE 3.

(2) £. s. d. £. s. d.
38)6 6 8(0 3 4
20
38)126
114
12
12
38)152
152

(3) £. s. d. £. s. d.
74)46 17 4(0·12 8
20
74)937
74
197
148
49
12
74)592
592

(4) *L. s. d.*

95)189 14 0(1*l.* 19 1*s*

95

94

20

95)1894

95

944

855

89

12

95)1068

95

118

95

remains 23

(5) *L. s. d.*

106)310 12 0½(2*l.* 18 7¼

212

98

20

106)1972(18*s.*

106

912

848

64

12

106)768(7*d.*

742

26

4

106)106(¼

106

(6) *L. s. d.*

654)3236 12 4½(4 18 11¼

2616

620

20

654)12412(18*s.*

654

5872

5232

640

12

654)7684(11*d.*

654

1144

654

490

4

654)1962(3 qrs.

1962

Application.

(1) s. d.
4 | 17 6
4 4½

(2) £. s. d.
8 | 3 11 8
0 8 11½

(3) £. s. d.
12 | 3 3 0
0 5 3

(4) £. s. d.
4 | 18 6 0
6 | 4 11 6
0 15 3

(5) £. s. d.
6 | 17 13 6
7 | 2 18 11
0 8 5

(6) £. s. d.
10 | 83 6 8
10 | 8 6 8
0 16 8

(7) L. s. d.
58 | 2 5 11
20
45
12
58 | 551 (9*d.*
522
29
4
58 | 116 2 qrs.
116
ans. 9*d.*½ per lb.

(8) L. s. d.
230 | 26 16 8
20
230 | 536 (2*s.*
460
76
12
230 | 920 (4*d.*
920
ans. 2*s.* 4*d.* per Bu.

(9) L. s. d.
814 | 66 2 9
20
814 | 1322 (1*s.*
814
508
12
814 | 6105 (7*d.*
5698
407
4
814 | 1628 (2 qrs.
1628
answer 1*s.* 7*d.*½

(10) L.
3540 | 7965 (2*l.* 5*s.* each.
7080
885
20
3540 | 17700 (5*s.*
17700

(11) L. s. d.
5 × 20 = 100 { 10 | 94 3 4
10 | 9 8 4
answer 0 18 10

(12) L. s. d.
144 { 12 | 57 0 0
12 | 4 15 0
answer 0 7 11

(13) L. s. d.
400 | 14 3 4
20
283
12
4,00 | 34,00
answer 8*d.*½

(14)

L.	s.	d.		L.	s.	d.	
173	13	9÷4=		43	8	5¼	A.
147	12	4÷2=		73	15	8	B.
128	9	11×3÷4=		96	7	5¼	C.
		Sum left		213	11	6½	answer

(15)

	L.	s.	d.	
From	1000	0	0	
1000 ÷3=	333	6	8	Wife's legacy.
÷4=	250	0	0	Eldest Son's do.
Take	583	6	8	
	2)416	13	4	
answer	208	6	8	each of the other Son's.

REDUCTION.

EXAMPLES.

(3) $\frac{1}{10}$)85 cts.
— $8\frac{1}{2}$
answer $76\frac{1}{2}d.$

(5) $\frac{1}{9}$)73*d.*
+ $8\frac{1}{9}$
answer $81\frac{1}{9}$

(6) 742 dols.
× 1000m.=1 dol.
answer 742000 mills.

(7) 1,0)7546,0 m.
1,00)75,46 cts.
ans. 75d 46 cts.

(8) dimes.m.
149,33=1 doub.
× 12
Fac. 1791d.96 m.

(9) D.cts.
94,44=1£.
× 100
Facit. 44E.4d.00 ct.

(10)
460cts.=1 Guin.
50
23000 Facit.

(11)

L.	s.	d.
2691	13	2
20		
53883		
12		

Facit 645998 *d.*

(12)
12)87600
2,0)730,0
Facit 365 £.

(13)
12)322999
2,0)2691,67*d.*
Facit £. 1345 16 7

(14) *L. s. d.*
916 10 9½
20
18330 *s.*
12
219969 *d.*
4
ans. 879879 qrs.

(15) *L. s. d.*
77 14 7½
20
1554 *s.*
12
18655 *d.*
2
ans. 37311 half *d.*

(16) Qrs.
4)879879
12)219969½
2,0) 1833,0 9*d.*
ans £.916 10 9½

(17) 2)37311 half *d.*
12)18655½
2,0) 155,4 7*d.*
ans. 77 14 7½

(18) 1678dols.
15 six *d.* = 1*d.*
Facit 25170 six *d.*

(19) 728 dols.
90*d.* = 1*d.*
65520 *d.*
4
ans. 262080 qrs.

(20) 4)262080 qrs. then 728
9,0)6552,0 *d.*
728 dols.
3
8)2184
ans. 273*l.*

(21) D.c.m.
4, 66 2 = 1 Guinea.
85
23310
37296
answer 396, 27cts.

(22)
450 Moidores,
6 dols. = 1 Moidore
answer 2700 dols.

(23) *L. s. d.*
137 15 6¾
20
2755
12
33066
4
4)132267 qrs. Facit.
12)330663/4
2,0 2,5 5 6*d.*
Facit 137 15 6¾

(24) *L. s. d.*
275 11 1½
20
5511
12
66133
2
2)132267 half *d.* Facit.
12)66133½
2,0 5511,1 1*d.*
Proof 275 1 1½

(25) 5)630

Facit 126 dols.

(26) 728 dols.

3

8)2184

ans. 273*l.*

(27) 546*l.*

8

3)4368

ans. 1456 dols.

(28) 537 dols.

3

8)1611

answer 201 7 6

(29) 402*l.* 15

8 + 6

3)3222

answer 1074 dols.

(30) *L. s. d.*

697 2 6

20

13942

12

1 Cr.=99*d.*)167310(1690

99

683

594

891

891

0

or thus *L. s. d.*

697 2 6

8

3)5577

11)1859 dols.

— 169

answer 1690 Cr.

(31) 845 French Cr.

99

7605

7605

12)83655 *d.*

2,0)697,1 3

answer *L.* 348 11 3

(32) $\frac{1}{11}$)891 dols.

— 81

answer 810 Fren. Cr.

(33) $\frac{1}{10}$)1620 Fren. Cr.

+ 162

answer 1782 dols.

(34) 2,0)678 Eng. guin.

+ 33 18

L. 711 18 Sterl.

again 678

7

4)4746

answer 1186 10 currency.

(35) six pences *L. s.*

A Crown=10 279 13

$\frac{1}{2}$ Crown = 5 20

Shilling = 2 5593

2

17)11186(658 of

102 each.

98

85

136

136

(36) $\frac{1}{2}$)461 *l.* N. York. or thus 461 (37) 1685 *l.*
$2\frac{1}{2}$ dols. = 1 *l.* 5 2
922 2)2305 5)3370
$+230\frac{1}{2}$
ans. $1152\frac{1}{2}$ $1152\frac{1}{2}$ ans. 674 *l.* N. Caro.

(38) 112 *l.* (39) 1620 dols. (40) 138 *l.*
30 7 10
7)3360 3,0)1134,0 3)1380
ans. 480 dols. Facit 378 *l.* answer 460 dols.

(42) D.cts.
(41) 436 dols. 4,44 = 1 *l.* (43) 1 *l.* = 444 D.cts. 2664,00 (600
3 25 2664
1,0)130,8 2220 00
L 130 16 *s.* 888
D: 111,00 cts.

(44) 185 dols. (45) $\frac{3}{5}$)3550 livers.
m. 1000 mills = 1 D. $18\frac{1}{4}$ cts = 1 livre.
livre = 185) 185000 (1000 livres. 28400
185 3550
1775
000 dols. 656,75 cts.

(46) 780 dols.
100
1 guilder = 39 cts.) 78000 (2000 g. (47) 3475 guilders
78 39 cts. = guilder
000 31275
10425
dols. 1355,25

(48) D.c.m.
1 French pistole = 3,66,7
246
22002
14668
7334
answer 902,08,2 m.

(49) 500 Spanish pistoles.
7
5)3500
Facit 700 *l.*

(50) 180 English guin.
7
4)1260
ans. 315*l.*

(51) 350 Moidores.
9
4)3150
ans. 787 10*s.*

(52) 120 Doubloons
66*s.*=1 Doubloon
720
720
2,0)792,0
answer 396*l.* Sterling.

again 120
5
8)600
+75
answer 675*l.* currency.

(53) 1240 Moidores.
9
7)11160
ans. 1594G.&6*s.*

again 1240
9
4.11160
2790*l.* currency.

(54) 1320
2
3)2640
ans. 880*l.*

TROY WEIGHT.

(1) 37lb.
12
444 oz.
20
8880 dwt.
24
35520
17760
ans. 213120 grs.

(2) 24= 4)213120 grains.
6) 53280
2,0) 888,0
12)444
answer 37 lbs.

(3) lb.dwt.gr.
59 13 5
12
708
20
14173
24
56697
28346
340157 grains.

(4) lb.oz.dwt.
4 7 2
12
55
20
1102
24
4408
2204
26448 =grains in 1 ingot.
4
answer 105792 do. in 4 do.

(5) lb. oz.dwt.
9 7 19
12
oz.dwt.
5 10 115
20 20
11,0) 2310
answer 21 spoons.

(6) dwt.
10=½oz.
24
24,0)456,0(19 answer.
24
216
216

(7) lbs. oz.dwt.gr.
2 1 15 0×12= 25 9 0
1 3 15 22×12= 15 9 11
answer lbs. 41 6 11

(8) lb. oz.
19 3
12
11)231
ans. 21 porringers

AVOIRDUPOIS WEIGHT.

EXAMPLES.

(1) 15 Tons
20
300Cwt.
4
1200 qrs.
28
9600
2407
ans. 33600lbs.

(2) 28= 4)67200 / 7)16800 / 4)2400 / 2,0)60,0 C.
ans. 30T.

(3) C. qr. lb.
9 0 5
4
36
28
293
72
1013
16
ans: 16208oz.

(4) Drams.
16= 4)20571005 / 4) 5142751 1
16= 4) 1285687 13 dr. / 4) 321421 3
28= 4) 80355 7oz. / 7) 20088 3
4) 2869 23lb.
2,0 717 1qr.
Tons 35 17 1 23 7 13

(5) C.qr. lb.
2 2 11
6
15 2 10
4
62
28
496
125
answer 1746 lbs.

(6) 235 Parcels.

52

470

1175

28 = { 4)12220 / 7) 3055 }

4) 436 12 lb.

answer C. 109 0 12 lb.

(7) C. qr. lb.

17 1 6

4

69

28

558

138

34)1938(57 Parcels.

170

238

238

(8) 12)3492 lbs.

28 = { 4)291 / 7) 72 3 }

4) 10 11 lb.

C. 2 2 11

APOTHECARIES WEIGHT.

EXAMPLES.

(1) 17 lbs.

12

204 oz.

8

1632 dr.

3

answer 4896scru.

(2) 2,0)133200,5 grs.

3) 66600 5

8)22200

12) 2775

answer 231lb. 3dr. 5gr.

(3) 5 lb.

6

8

16 = { 4)480 / 4)120 }

answer 30 parcels

(4) 24 drams.

20 parcels.

8)480

12) 60

answer 5 lb.

LONG MEASURE.

EXAMPLES.

(1) 273 miles.

8

2184

40

$\frac{1}{2}$) 87360

$5\frac{1}{2}$

436800

43680

480480

3

1441440

12

answer 17297280 inches.

(2) 12)34594560

3) 2882880

960960

2

11)1921920

4,0)17472,0

8)4368

ans. 546 miles.

(3) M fur. P. yds. ft. in.

2 1 8 3 0 2

8

17

40

$\frac{1}{2}$) 688

$5\frac{1}{2}$

3443

344

3787

3

11361

12

ans. 136334 inches.

(4) b.c.

3)2280060

12)760020

3)63335

21111 2 feet.

2

11) 42222

4,0) 3838 2yd.

8) 95 38 P.

answer 11m.7f.38p.2y.2f.

(5) 15[illegible] miles.

8

1200

40

[illegible])48000

$5\frac{1}{2}$

0000

24000

264000

ft. in.

18 4

12

22,0

264000

3

792000

12

2)9504000

11)475200

answer 43200

(6) Revolutions.

ft. in. 86400

18 4 × 12 = 220 in.

1728000

1728

12)19008000

3) 1584000

528000

2

11)1056000

4,0)9600,0

8)2400

answer 300 miles.

(7) $\frac{1}{2}$)360 degrees.

$69\frac{1}{2}$

3240

2160

180

25020

8

200 : 60 × 40

$\frac{1}{2}$) 8006400

$5\frac{2}{2}$

40032000

4003200

answer 44035200 yards.

CLOTH MEASURE.

EXAMPLES.

(1) Yds. qr. na.

15 3 1

4

63

4

answer 253

(2) na.

4)1012

4)253

answer 63yds. 1qr.

(3) E.F.

73

3

ans. 219 qrs.

(4) na.

4)1752

3)438

answer 146 E.F.

(5) na.

4)1408

5) 352

answer 70E.E. 2qr.

(6) Bales.

10

10

100

12

ans. 1200yds.

(7) Yds. qr.

408 3

4

3)1635

545 E.F.

3

5)1635

answer 327 E.E.

(8) Bales.

4
12
48 pieces.
24
192
96
1152 E.E.

then 1152 E.E.

5
4)5760
1440 yds.
4
3)5760
ans. 1920 E.F.

LAND MEASURE.

EXAMPLES.

(1)

A. R. P.
27 1 32
4
109
40
answer 4392 perches.

(2) Perches.

40)439,2
4)109 32 P.
answer 27A. 1R. 32P.

(3)

A. R. P.
1st Field 6. 2 36
2d do. 10 0 0
3d do. 12 1 0
28 3 36
4
115
40
76)4636(61 shares.
456
76
76

(4) Perches.

25 = 5)1299600
5) 259920

40)5198,4 = Per. in each
4)1299 24P.
answer 324A. 3R. 24P.

LIQUID MEASURE.

EXAMPLES.

(1) 19 hhds.

63
57
114
1197 gals.
4
4788 qts.
2
9576 pints.

(2) 2)19152 pints.
9576 qts.

63 = 7)2394 gal.
9) 342
answer 38 hhds.

(3) ½)11 Bar.
1 Bar. = 31½ gal.
11
33
05 2qt.
346 2
4
answer 1386 quarts.

(4) 165 gal.
a gallon = 8 pts. 4
a quart = 2 660
a pint = 1 2
division 11)1320 pints.
12) 120
answer 10 doz.

DRY MEASURE.

EXAMPLES.

(1) Bu.P.qt.
17 0 5
4
68
8
549 qts.
2
answer 1098 pints.

(2) Pts.
2)5054
8)2527
4) 315 7qts.
answer 78bu. 3p. 7qts.

(3) Bu. P. qt.
One granary contains 65 1 6
4
Bu.P.
5 2 261 3 0
4 4
22)1047(47 Sacks.
88
167
154
13 pecks over, = 3bu. 1p.

TIME.

EXAMPLES.

(1) w. d.
37 5
7
264
24
1056
528
6336

6336
60
answer 380160 min.

(2) seconds.
6,0)2479680,0
6,0) 41328,0
24 = 4)6888
6)1722
7) 287
answer 41 weeks.

(3) D. hr.
A Year = 365 6
24
1466
730
8766 hours.
60
525960 min.
60
answer 31557600 sec.

(4) 4604 Years.
$\frac{3}{4}$1790
$\frac{1}{4}$)5794
$365\frac{1}{4}$
28970
34764
17382
$1448\frac{2}{4}$ day = 12 hours.
answer 2116258D. 12hr.

MOTION.

EXAMPLES.

(1) 6 sig.
30
180
60
answer 10800 min.

(2) A revolution = 360 deg.
60
21600
60
answer 1296000 sec.

Application.

(1) 4)400
100
3
8)300
Facit £.37 10

(2) A mark = $\frac{2}{3}$ £.
therefore mul. £.496 13 4
by 3+2
2)1490
answer 745 marks.

(3) 1260 Moid.
9
7)11340
answer 1620 Eng. guineas.

(4)

s.	d.	
	4	7
	52	
s.	d.	
5	6½	55
12		2
66		110
2		×476
133		)52360

then 133)52360(393 Duca.
399
1246
1197
490
399
remains 91 ½*d.*=3*s.* 9*d.*½ over.

(5)

£.	s.	d.	£.	s.	d.
6	17	3½	123	11	3
	20			20	
	137			2471	
	12			12	
	1647			29655	
	2			2	
	3295			59310	

then 3295)59310(18 ans.
3295
26360
26360

(6) 36 oz.
8
12)288
answer 24 plates.

(7) Gallons.
Pipes 250×126 =31500
Hhds. 130× 63 = 8190
half do. 150× 31½= 4725
44415 gals. in all.
8=pints in 1 gal.

28= { 4)355320 lbs.
7) 88830
4) 12690
2,0) 317,2 2qrs.
Facit 158T.12C.2qr.

(8) C. qr. lb.
2 1 14.
4
9
28
266
28
7448

then 38)7448(196 canisters
38
364
342
228
228

(9) C. qr. lb.
4 3 24
2
9 3 20
6 9
8 9
12 9
16 104
42)1112(26 of each, and 20lb. over
84
272
252
rem. 20 lb.

(10) Deg.
½)360
69½
3240
2160
180
25020 miles.
8
200160 fur.
40
½)8006400 per.
5½
40032000
4003200
44035200 yds.
3
132105600 ft.
12
1585267200 in.
3
4755801600 b.c. ans.

(11) C. qr.
7 2
7
7
756
840 lbs. in 1 hhd.
2
24)1680 70 boxes.
168
0

(12) C. qr. lb.
12 1 10
4
49
25
245
99
1235 lbs in 1 hhd.
56
7410
6175
69160

then 112)69160(617 2 ans.
672
196
112
840
784
56 lbs=2qrs.

(13) 46 Bales.
24
184
92
1104 pieces.
42
2208
4416
46368 E.Fl.

then 46368
3
4)139104
answer 34776 yards.

(14) M.fur.yds.
7 1 94
8
57
40
$\frac{1}{2}$)2280
$5\frac{1}{2}$
11400
1140
94
12634
3
E.in.b c.
2 8 2 37902
12
454824
3
98)1364472

98)then 1364472(13923 steps.
98
384
294
904
882
227
196
312
294
remains 18

```
(15) ft.in.b.c. 12898          then 7983862
     17 2 1 =   619 b.c.            760320
              ------              --------
              116082               380662
              12898                380160
             77388                 ------
             --------                 502 remain.
:.in a M.190080)7983862(42
```

```
5)   Years.                    then 2116258
      4004                                24
      1790                        --------
    ¾)5794                         8465034
      365¼                        4232517
    -------                       ---------
     28970                        50790204
    34764                               60
   ------                         -----------
   17382                          3047412240
     1448 ¾=12 hr.                        60
   ---------                      -------------
   2116258 12 hr.              ans. 182844734400 sec.
```

```
7)  Y. qr. na.                 then 86
    2  3  0                      × 450
    1  1  0                      -----
    1  1  2                        430
   ---------                      344
    5  1  2                     -------
    4                           4)38700
   ---                           -------
    21                         4) 9675
    4                            -------
   ---                         answer 2418yd. 3qrs.
    86
```

```
8)  lbs. oz.dwt.gr.            then dwt.gr.
     3   5  16  2                     5  7
    12                               24
   ----                              ---
    41                               127  )20066(158 rings.
    20                                     127
   ----                                    ----
   836                                      736
    24                                      635
   ----                                     ----
   3346                                     1016
   1672                                     1016
   -----                                    ----
   20066
```

THE SINGLE RULE OF THREE.

EXAMPLES.

(2) Stated thus. As 8yd. : 3D.20c. : : 96yd. : 38D.40c.
For 3,20×96=307,20 which ÷8=38,40 answer.

(3) Stated thus: 3D. 20ct. : 8yd. : : 38D.40ct. : 96yd.
For 38,40×8=307,20 which ÷3,20=96yd. answer.

(4) yd £. s. yd. (5) lb. D. ct. lb.

Thus: As $7\frac{7}{8}$: 44 16 :: $\frac{9}{7}$ Thus: As 96 : 9,60 :: 1

1 1

See the note. 8)44 16 96)9,60(,10ct. ans.
answer £. 5 12s. 96
0

lb. d. lbs. £. s. d. d. £. s. d.

(6) As 1 : 8 :: 112 : 3 14 8 ans. For 112×8=896=3 14 8

(7) Thus: As 1lb. : 15d. :: 112lb. : 7l. For 112lb. × 15d. =1780d. and 1780d. ÷12 and by 20=7l. answer.

gal. d. gal qts. d. qts. £. s.

(8) Thus; As 1 : 16 :: $31\frac{1}{2}$ Or, As 4 : 16 :: 126 : 2 2
For 126×16=2016 which ÷4=504d. and 504÷12 and by 20=2l. 2s. answer.

(9) 19×12=228 pair; then as 228pr. : 136,80ct. :: 1pr. : 6oct For 136,80 ÷ 228=,6octs. answer.

(10) 3C.=336lb. then As 1lb. : 20ct. :: 336lb. : 67D.20ct.
For 336×20=67D. 20ct. answer.

(11) Thus: As 1C. : 1l. 8s. : : 33C 1qr. 22lb. Or, as 112lb. : 28s. :: 3746lb. : $932\frac{56}{112}s$ For 3746×28 =104888 which ÷ 112=$932\frac{1}{2}s$. or 46l. 12s. 6d. ans.

(12) 12pcs.×12yd. =144yd, Then as 1yd. : 1,40c. :: 144yd. : 201,60ct. For 144×1,40=201D.60ct. answer.

(13) Thus: As 3 oz. 10dwt. : 9l. 2s. 6d. : : 1 oz. Or, As 730dwt : 2190d. : : 20dwt. : 60d. For 2190× 20=43800 which ÷730=60d. or 5s. answer.

(14) Thus: As 1D. : 70ct. :: 1000D. : 700D. For, 1000 ×,70=700D. answer.

(15) Thus: As 17C.3qr.17lb. : 133l. 13s. 4d. :: 1oz. : 1d. or, As 32080 oz. : 32080d. :: 1 oz. : 1D. answer.

(16) Thus: As 26s. 8d : 1C :: 23l 10s. Or, as 320d. : 1C : : 5640d. : 17C. 2qr. 14lb. For 5640÷ 320 =$17\frac{40}{112}$C.=17C. 2qr. 14lb. answer.

(17) Thus: As 90lb. : 18*l.* :: 518lb. : 103*l.* 12*s.* For $518 \times 18 = 9324$ which $\div 90 = 103l.$ 12*s.* whole cost. And as 90lb. : 18*l.* :: 1*l.* : 4*s.* per lb. answer.

$$\frac{20}{36{,}0 \div 90 = 4s.}$$

(18) 17T. 12C. = 352, then as 352C. : 440D.00 :: 2C. : 2D.5oct. For $440{,}00 \times 2 = 880{,}00$ which $\div$ 352 = 2D,5oct. answer.

(19) Thus: As 1day : 2D.4oct. :: 365 : 876D. For $365 \times 2{,}40 = 876$D. answer.

(20) First 546lb. × 14 bags, = 7644lb. and 48 guin. × 35*s.* = 1680*s.* and 1C. = 112lb; then, As 7644lb. : 1680*s.* :: 112lb. : $24s.\frac{4704}{7644}$, For $1680 \times 112 = 188160$ which $\div 7644 = 24\frac{4704}{7644}s.$ or 1*l.* 4*s.* 7*d.*$\frac{1}{4}$ + answer.

(21) $58 + 62 + 65\frac{1}{2} = 185\frac{1}{2}$gal. in 3 casks, then, as 1gal. : 89c. :: $185\frac{1}{2}$ gal. Or, as 4qts. : 89c. :: 742qts. : 165D. 09ct. 5m. For $742 \times 89 = 660{,}38$ which $\div 4 = 165$D. 9ct. 5m. answer.

(22) $23 + 24 + 25 + 27 = 99$ yards in the 4 pieces. Then, as 1yd. : 72ct. :: 99 : 71D. 28ct. For $99 \times 72 = 71$D. 28ct. answer

---

(23) $26\frac{1}{2} \times 2 + 23\frac{1}{4} \times 2 = 100\frac{1}{2}$yards, or 402qrs. Thus: as 4qrs. : 44ct. :: 402qrs. : 44D.22ct; For $402 \times 44 = 176{,}88$ which $\div 4 = 44$D.22ct. answer.

(24) 21*s.* 4*d.* = 256*d.* then as 1yd. : 256*d.* :: 86yd. : 22016*d.* 254*l.* 10*s.* = 61080*d.* and 61080*d.* − 22016 = 39064*d.* also, 242 − 86 = 156yds. then as 156yds. : 39064*d.* : 1yd. : 250*d.*$\frac{1}{2}$; For $39064 \div 156 = 250\frac{1}{2}d.$ Or, 20*s.* 10*d.* $\frac{3}{4}$qrs. answer.

£. 162 15*s* 4*d.* = 39064*d.* Now say, as 156yds. : 39064*d.* :: 1yd : $250\frac{1}{4}d.$ For, $39064 \div 156 = 250\frac{1}{4}d. = 20s.$ 10*d.*$\frac{1}{4}$ + per yd answer.

(25) Thus: As 1yd. : 7*s.* 9*d.*$\frac{1}{2}$ :: 53E.e. 1qr. Or, as 4qrs. : 374qrs. :: 266qrs. : 24871qrs. For $266 \times 374 = 99484$ which $\div 4 = 24871$qrs. or 25*l* 18*s* $1\frac{1}{4}d.$ ans.

(26) Thus: As 159*l* 2*s.* : 43C. 2qrs. :: 26*l* 10*s* 4*d.* Or, as 38184*d.* : 174qrs. :: 6364*d.* : 29qrs. For 6364×174qrs. = 107336 which $\div$ 38184 = 29qrs. or 7C. 1qr. answer.

(27) Thus: As 977*l.* : 420*l.* 6*s* $3d.\frac{1}{4}$. : 1*l.* Or, as 977*l.* : 403501qrs. :: 1*l.* : 413qrs. For $403501 \div 977 = 413$qrs. = 8*s* 7*d.*$\frac{1}{4}$ answer.

(28) Thus: As 1 oz. : 5*s* 9*d*. :: 73lb. 5 oz. 15dwt. Or, as 20dwt. : 69*d*. :: 17635dwt. : 6084o*d*.$\frac{1}{4}$ For 17635 $\times$ 69 = 1216815 which $\div$ 20 = 6084o*d*.$\frac{1}{4}$ = 253*l* 10*s* o*d*.$\frac{1}{4}$ answer.

(29) Thus: As 1C. : 2*l* 6*s* 6*d*. :: 3C. 1qr. 7lb. $\times$ 3. Or, as 112lbs. : 558*d*. :: 1113lbs. : 5545*d*.$\frac{14}{112}$ For 1113 $\times$ 558 = 621054 which $\div$ 112 = 5545$\frac{1}{2}$*d*. or 23*l* 2*s* 1*d*.$\frac{1}{2}$ answer.

(30) Thus; As 1*l*. : 3*s* 6*d*. :: 763*l* 15*s*. Or, as 20*s*. : 42*d*. : : 15275*s*. : 32077*d*.$\frac{1}{2}$ For 15275 $\times$ 42 = 641550 which $\div$ 20 = 32077$\frac{10}{20}$*d*. or 133*l* 13*s* 1$\frac{1}{2}$*d*. ans.

(31) Thus: As 7*s* 9*d*.$\frac{1}{2}$: 1yd. :: 25*l* 18*s* 1*d*.$\frac{1}{4}$ Or, as 374qrs. : 4qrs. :: 24871qrs. : 266qrs. For 24871 $\times$ 4 = 99484 which $\div$ 374 = 266qrs. $\div$ 5 = 53E.e. 1qr. ans.

(32) Thus: As 1yd. : 18*s*. 6*d*. :: 1qr. 1na. Or, as 16na. : 222*d*. : : 5na. : 69$\frac{6}{3}$*d*. For 222 $\times$ 5 = 1110 which $\div$ 16 = 69$\frac{3}{8}$*d*. or 5*s* 9*d*.$\frac{3}{8}$ answer.

(33) Thus: As 8*s* 7*d*.$\frac{1}{4}$: 1*l*. : : 420*l* 6*s* 3*d*.$\frac{1}{4}$ Or, As 413qrs. : 1*l*. :: 403501qrs. : 977*l*. answer.

(34) Thus: As 1 oz. : 6*s* 4*d*. :: 1lb. 7 oz. 14dwt. Or, As 20dwt. : 76*d*. :: 394dwt. : 1497*d*.$\frac{4}{20}$ For 394 $\times$ 76 = 29944 which $\div$ 20 = 1497$\frac{4}{5}$*d*. or 6*l* 4*s* 9*d*.$\frac{4}{5}$ answer.

(35) Thus: As 1C. : 2*l* 19*s* 8*d*. :: 2C. 1qr. 14lb. $\times$ 7casks. Or, as 112lbs. : 716*d*. :: 1862*l*. : 11903$\frac{1}{2}$*d*. For 1862 $\times$ 716 = 1333192 which $\div$ 112 = 11903$\frac{1}{2}$*d*. or 49*l* 11*s* 11*d*.$\frac{1}{2}$ answer.

(36) Thus: As 1A. : 1*l* 7*s* 8*d*. :: 173A. 2R. 14P. Or, As 160P. : 332*d* :: 27774P. : 57631*d*.$\frac{8}{160}$, For 27774 $\times$ 332 = 9220968 which $\div$ 160 = 57631*d*.$\frac{8}{160}$, or 240*l* 2*s* 7*d*.$\frac{8}{160}$ answer.

(37) Thus: As 5yds. : 14*s* 2*d*. :: 21yds. 1qr $\times$ 9pcs. Or, as 20qrs : 170*d*. :: 765qrs : 6502*d*.$\frac{10}{20}$, For 765 $\times$ 170 = 130050 which $\div$ 20 = 6502$\frac{1}{2}$*d*. or 27*l* 1*s* 10$\frac{1}{2}$*d*. ans.

(38) First, 3858,24ct—1200D = 2658,24ct. to be expended yearly: Then, as 365days. : 2658,24ct. :: 1day : 7,28+ For 2658,24 $\div$ 365 = 7D. 28ct. + answer.

(39) Thus: As 1day : 2D. 14ct. :: 365days : 781,10ct. For 365 $\times$ 2,14 = 781D. 10ct. he spends yearly. Then 1333—781,10 = 551D. 90ct. saves yearly.

(40) Thus: As 7ft. : 4ft. :: 198ft.

4

792 $\div$ 7 = 113$\frac{1}{7}$ feet, answer.

(41) Thus: As 24 hr. : 360 Deg. × 69½ M. :: 1 min. Or, As 1440 min. : 25020 M. :: 1 min. : 17⅜ M. For 25020 ÷ 1440 = 17M. 3fur. answer.

(42) 53+94+40+27=214ct. will buy 1 lb. of each. Then, as 214ct : 1lb. :: 149800cts. : 700lb. of each. For 149800 : 214=700lb. answer.

(43) Thus: As 14lb. 3 oz. 8dwt. : 1371,2oct. :: 1 oz. Or, as 3428dwt. : 1371,2oct. : : 20dwt. : 8D. For 1371,20 × 20=27424 which ÷ 3428=8dols. answer.

(44) 1,66+1,97+2,31=5,94 will pay for 1 ream of each. Then, as 5,94ct. : 1 ream : : 528,66ct. : 89 reams; For 528,66 ÷ 5,94=89 reams of each sort. answer.

(45) Thus: As 9C. 3qrs. : 27*l* 17*s* 6*d*. :: 2C. 1qr. 11lb. Or, as 1092lb : 6690*d*. :: 263lbs. : 1611*d*.+ For 263 × 6690=1759470 which ÷ 1092=1611*d*.+ Or. 6*l* 14*s* 3*d*. answer.

(46) Thus: As 1C. : 28*s* 7*d*. :: 59C. 1qr. 14lb. Or, as 112lb. : 343*d*. :: 6650lb. : 20365*d*.½⅛ For 6650 × 343=2280950 which ÷ 112=84*l* 17*s* 1*d*.⅛+ answer.

(47) Thus: As 1A. : 9D. : : 476A. 3R. 28P. Or, as 160P. : 9D. :: 76308P. : 4292D. 32ct. 5m. For 76308 × 9= 686772 which ÷ 160 =4292,32ct. 5m. ans.

INVERSE PROPORTION.

EXAMPLES.

(2) Thus: As 1½yd. : 7½yds. :: 3qrs. Or, as 6qrs. : 30qrs. :: 3qrs. : 60qrs. For 30 × 6=180 which ÷ 3 =60qrs. or 15yds answer.

(3) Thus: As 12days : 100men :: 3days
12

1200 ÷ 3=400 men. answer.

(4) Thus: As 12 in.leng. : 12 in.br. :: 4⅓ in.leng. Or, as 24half in. : 12 in. : : 9half in. : 32 in. For 24 × 12=288 which ÷ 9=32 in. answer.

(5) Thus: As 1yd. : 27ft × 20ft. :: 2ft. 6in. Or, as 36 in. : 540ft. :: 30in. : 648ft. For 540 × 36=19440 which ÷ 30=648ft ÷ 9=72yds. answer.

(6) Thus: 5qrs : 30yds. :: 3qrs.
5

150 ÷ 3=50yds. answer.

(7) Thus: As 12m. : 100*l.* :: 8m.

— 3 —
3 2

300÷2=150*l.* answer.

(8) Thus: As 4qrs. : 20yds.×4=80yds :: 5qrs.

4
320÷5=64yds. answer.

(9) Thus: As 24day : 5 men :: 15 day : 8 m.

5
120÷15=8 men. answer.

(10) Thus: As 5 men : 24 days :: 8 men : 15 days

5
120÷8=15 days. answer.

(11) Thus: As 4)16hr. : 3days :: 4)12hr. : 4 days.

4 4 3
12÷3=4 days. answer.

(12) Thus: As 6)6 men : 12 days :: 6)24 men : 3 days

— 1 — answer.
1 4

12÷4=3 days. answer.

(13) Thus: As 4P. : 40P. :: 8P. : 20P.

4
160÷8=20 perches. answer.

(14) Thus: As 50,0*l.* : 6m. :: 22,0*l.* : $13\frac{7}{11}$m. For 50 ×6=300 which÷22=$13\frac{14}{22}$ months, or 13m. 19d.+ ans.

(15) Thus: As 4*s* 6*d.* : 12 oz. :: 3*s.* : 18 oz. Or, as 18)54*d.* : 12 oz. :: 18)36*d.* : 18 oz.

— ×3 —
3 2

36÷2=18 oz. answer.

(16) Thus: As 3qr. in : 208lbs :: 39in.×4qrs.=156qr. in. : 4lb.

×3
624÷156=4lbs. answer.

(17) Thus: As 2 m. : 800 men :: 5 m.

2
5)1600

Then, 800—320=480 men depart.

(18) Thus: As 4qrs. : 18×30 :: 2qrs.

30
540
4 ft.
2)2160(1080÷9=120yd. ans

(19) Thus: As 40P. : 4P. :: 13½P.

2 2
80 27
4
P.yds.ft.in.b.c.

27)320(11 4. 2 0 2 answer.
27 then 27)126(4 yds.
50 108
27 18 feet.
½)23 3+1 ft.
× 5½ 27)55(2 ft.
115 54
+11½yd.=1ft.6in. 1
27)126(4yds. 12+6in.
18
3
27)54(2b.c.
54

(20) *s. d.* oz. *s. d.*
Thus: As 6 3 : 9 :: 8 2½

12 12
75 98
2 2
150 197
9
197)1350(6 oz. 13dr.+answer.
1182 then 197)2688(13dr.
168 197
16 718
197)2688(13dr. 591
remains 127

(21) Thus: As 8,0*l.* : 15yds. :: 60,0*l.*
8
6,0)12,0
answer 2 years.

Application.

(1) Thus: As 7*s.* 3*d.* : 3qrs. :: 13*l* 15 6*d.* Or, as 87*d.* : 3qrs. :: 3306*d.* : 114qrs. For 3306×3=9918 which÷87=114qrs. or, 28yds. 2qr. answer.

(2) Thus: As 9lbs. 9 oz. 12dwt. : 411*l* 12*s.* :: 1gr. Or, as 56448grs. : 98784*d.* :: 1gr. : 1*d.*¾ For 98784÷56448=1*d.*¾ answer.

(3) Thus inversely: As 25*d.* : 7mo. :: 300*l.* : $5\frac{5}{6}$mo. For $250 \times 7 = 1750$ which $\div 300 = 5\frac{5}{6}$mo. or 5mo. 25*d.* answer.

(4) Thus: As 1day : 19*s* 7*d.* = 235*d.* :: 365days : 85775*d.* For $365 \times 235 = 85775d.$ which $\div 12$ and by $20 = 357l.$ 7*s* 11*d.* Then 500 guin. $\times 21 = 10500s.$ which $\div 20 = 525l.$ and Lastly $525l. - 357l\ 7s\ 11d = 167l\ 12s\ 1d.$ answer.

(5) Thus: As 1yd. : 13*s* 2*d.*$\frac{1}{2}$ :: 52E.E. 3qrs. Or, as 4qrs. : 634far. :: 263qrs. : 41685+ farthings. For $263 \times 634 = 166742$ which $\div 4 = 41685$ qrs. or 43*l* 8*s* 5*d.*$\frac{1}{4}$ answer.

(6) Thus inversely: As

11days : 30men $\times 4$ :: 12days.

4

$120 \times 11 = 1320 \div 12 = 110$men. answer.

(7) Thus: As 1750*l.* : 32*l* 16*s* 3*d.* :: 1*l.*

20

656

12

$7875 \div 1750 = 4d.\frac{1}{2}$ answer.

(8) First 3'Tons = 12 hhds. = 756 gals. and 756—85 gals. = 671 gal. remain. Then say, as 671gal. : 151*l* 14*s.* = 3034*s.* :: 1G. : 4*s* 6*d.*$\frac{1}{4}$+ For $3034 \div 671 = 4\frac{510}{671}s. = 4s\ 6d.\frac{1}{4}$.

(9) Thus inversely: as 5C. 0qr. 14lb. : 96m. :: 3C. 1qr. Or, as 574lbs. : 96m. :: 364lbs. : $151\frac{140}{364}$ miles. For $574 \times 96 = 55104$ which $\div 364 = 151$M. 3fur. 3P. + ans.

(10) Thus: As 200yds. : 90*l.* — 7*l* 10*s.* = 82*l* 10*s.* :: 1e.E. Or, as 800qrs. : 1650*s.* :: 5qrs. : $10\frac{5}{8}s.$ For $1650 \times 5 = 8250$ which $\div 800 = 10\frac{250}{800}s.$ or, 10*s* 3*d.*$\frac{3}{4}$ answer.

(11) Thus inversely: As 512m. : 225C. :: 64m. : 1800C. For $512 \times 225 = 115200$ which $\div 64 = 1800$C.wt. answer.

(12) First 6*s* 6*d.* $\div 2 = 3s\ 3d.$ price per yd. And 3*s* 3*d.* $\times 5 = 16s\ 3d.$ value of 5 yds. Then, 18*s* 9*d.* — 16*s* 3*d.* = 2*s* 6*d.* = 30*d.* gained on 5yds. 180yds. at 3*s* 3*d.* = 29*l* 5*s.* or 7020*d.* Then lastly, as 30*d.* : 5yds :: 7020*d.* : 1170 yds. answer.

(13) Thus: As 6ft. 4in. : 3ft. :: 633ft. 4in. : 300ft. or, As 76in. : 1yd. :: 7600in : 100yds. For $7600 \div 76 = 100$yds. answer.

(14) Thus: As 12yds. : 8yds. :: 24 pcs. × 20yds. = 480 : 320yds. For 480×8=3840 which÷12=320 yds. ans.

(15) First 100*l.*—60*l.*=40*l.* value of the Serge. And as 2yds.Ser. : 3yd.Shal. :: 237yd.Ser. : 355½yd.Shal. Then, yds. £. yd.

As $\left\{\begin{matrix}355\frac{1}{2} : 60 :: 1\\ 237 : 40 :: 1\end{matrix}\right\}$: 3*s* 4*d.*½ + answer.

(16) Thus: As 1*l* 7*s* 10*d.* : 4E.E. :: 1181 17*s* 7*d.*½ Or, as 668 half-pen. : 20qr. :: 57063 half-pen. : 1708qrs. 1na. + Then 2dly, as 33E.Fl. 1qr. 2na. : 1 piece :: 1708qrs. 1na. Or, as 402na. : 1piece :: 6833na. : 16 pieces and 401na. or 33E.Fl. 1qr. 1na. over. answer.

(17) Thus: As 5*s* 6*d.* : 1E.Fl. :: 352*l.* Or, as 66*d.* : 3qrs. :: 84480*d.* : 3840qrs. which÷4=960yds. in all. Again 3840qr. ÷ 5=768E.E. which÷64=12E.E. in each piece. answer.

(18) Thus: As 50ft. 11in. : 98ft. 6in. :: 300ft. 8in. Or, As 611 in. : 1182 in. :: 3608 in. : 6979 in. + Again, 20ft. 6in. + 30ft. 9in. = 51ft. 3in. or 615 in. to be deducted: Then, 6979in.—615in.=6364in. which÷12 & by 3 quotes 176yds. 2ft. 4in. answer.

(19) Thus inversely: As 12in. : 20ft. :: 7½in. Or, as 24 half in. : 20ft. :: 15half in. : 32ft. For 24×20=480 which÷15=32ft. answer.

(20) First, 20×5=100miles A travels before B sets out; and 25—20=5 miles B gains upon A in one day's travelling: Then say, as 5 m. : 1day :: 100m. : 20 days. and 20×25=500 miles. answer.

(21) 50—35=15 gallons the cistern retains in one hour: Then say, as 15gal. : 1hr. :: 230gal. : 15hr. 20min. answer.

(22)

	min.	Cis.	min.	Cis.
As	10	1 ::	60	6
	20	1 ::	60	3
	40	1 ::	60	1½
	80	1 ::	60	0¼

The 4 cocks in 1 hr. would fill 11¼ cis.

Cis. min. Cis. min.sec.
Then As $11\frac{1}{4}$: 60 :: 1 : 5 20 answer.

4 4 4

45) 240 4

225(5min. 20 sec.

15

60

900÷45=20 seconds.

(23) Thus: As 365days. 6hr. : 596900000m. :: 1min. Or, as 525960min. : 596900000m. : : 1 min. : 1134 miles. + For 596900000÷525960=1134 miles. ans.

(24) First, 75÷60=$1\frac{1}{4}$ pulsations in one second; Then, as $1\frac{1}{4}$ pul. : 1142ft. :: 6 pul. Or, As 5 fourths : 1142ft. :: 24 fourths : 5481ft.=1m. 201ft. answer.
For 5481÷(5280 the feet in a mile)=1m. 201ft. ans.

(25) Thus: As 1sec. 1142ft. :: 1min. 3sec. Or, as 1sec. : 1142ft. :: 63sec. : 71946, & 71946÷(5280=the feet in a mile)=13m. 5fur. answer.

DOUBLE RULE OF THREE DIRECT.

EXAMPLES.

(2) By two statings thus: As 4men : 48days :: 8men : 96days. Second, as 12days : 96acres :: 16days : 128 acres. answer.

Or thus, as 4men, 12days > acres 48 < 8men, 16days > 128 acres.

For 48×16×8÷12×4=128 acres answer.

(3) Thus: As 12)ox. 12 : 20)acres : : 24; Then, as 16)ox. : 40)acres :: 48 16)

1 — 2 — 1 — 3 — 3

24 oxen in 16 days eat 40 acres. answer 120 acres.

(4) As 18 horses, 20 days > Bu. 10 < 60 horses, 36 days. > 60 Bushels ans.

For 60×36×10÷18×20=60 Bushels answer.

(5) 7)men lbs. 7)men 14 days 14 lbs. days lbs.
Thus: As 7 : 56 :: 21 Then, as 14 : 168 : : 3 : 36 ans.

1 — 3 — 1 — 12

168 3

3

36 lbs. answer.

(7) 8)men *s.* 8(men.
Thus: As 8 : 64 :: 48
— 6 —
1 — 6
384
As 4)days *s.* 4)days
Then, as 4 : 384 :: 16
— 4 —
1 — 4
s. 1536÷20=76*l* 16*s.* answer.

mo. £. mo.
(7) Thus: as 7,00*l.* : 14*l.* :: 4,00*l.* Then, as 6 : 8 :: 60=
5 years. 4 60
56÷7=8*l.* 480÷6=80*l.* ans.

days acres days acres
(8) 16)men 16)acres men. Then, as 7 : 168 :: 19 :: 456
Thus: as 16 : 112 :: 24 19
— — 7 —
1 7 — answer 3192÷7=456*A.*
acres 168

(9) 16)men £. *s.* 16)men. Then, as 8)da. £. *s.* 8)da.
Thus: as 16 : 16 18 : : 32 8 : 33 16 : 24
— 2 — — 3 —
1 — 2 1 — 3
£. 33 16 £. 101 8 ans.

£. *s.* *d.*
(10) From 78 7 6
Take 75 0 0
3)mo. — 3)mo.
Thus: as 9 : 3 7 6 :: 12
— 4 —
3 — 4
3)13 10 0
£. 4 10
25)£. £. *s.* 25)£. £.
Then, as 75 : 4 10 :: 100 : 6
— 4 —
3 — 4
3)18 0
£. 6 per cent. answer.

(11) Thus: 1st, As 6men : 120*l.* :: 14men : 280*l.* Then, 2nd, as 21w. : 280*l.* :: 46w. : 613*l.* 6*s.* 8*d.* For 280 ×46=12880 which÷21=613*l.*$\frac{7}{21}$ or 613*l* 6*s* 8*d.* ans.

(12) Thus: As 100*l.* : 5*l.* 259*l* 13*s* 5*d.*

5

100)1298 7 1

Interest for a year £.12 19 8+

2nd 4)w. 4)w.

As 52 : 12*l* 19*s* 8*d.* :: 20

5

13 13)64 18 4

£. 4 19 10¼ answer.

(13) Thus; As 2m. : 12R. :: 8m.

8

2)96

6)days 6)days.

Second, as 6 : 48R. :: 24

4

1 4

answer 192 rods.

(14) As 8C. : 6,40cts. :: 4C. 2d, as 128m. : 3,20 :: 32

4 4 1

8)25,60 4 3,20

answer 80 cts.

(15) First, as 200lbs : 40cts. : 202000lb.

40

2,00)8080,00

Dols. 40,40

Second, As 40m. : 40,40cts. :: 60m.

60

2424,00÷40=60n.60ct. answer.

(16) Thus: As $\left\{\begin{array}{l}12\text{C.}\\ 9\\ \hline 108\end{array}\right.$: 16*l.* :: $\frac{1}{2})50\text{C.} \times 2\frac{1}{2}$

$100+25$

125×16

$108)2000\ (18l\ 10s\ 4d.\frac{4}{9}$

108

920

864

56×20

$108(1120(10s.$

108

40×12

$108)480(4d.$

432

$\frac{48}{108} = \frac{4}{9}d.$

20)Leag. £. *s.* *d.* 20)Leag.

2ndly, as 20 : 18 10 $4\frac{4}{9}$ :: 100

1 5 5

answer £. 92 11 $10\frac{5}{9}$

EXAMPLES.

(2) 1st. As D. days 4 : 3 :: D. 40

3

4)120

30 days.

2nd, As m. days 8 : 30 :: m. 20 Inversely.

8

20)240

ans. 12 days.

(3) 1st. As 8) *s.* men. 24 : 4 :: 8)*s.* 96

3 12

4

3)48

men. 16

2ndly, As days. 3 : men. 16 :: days. 16

3

16)48(3 men ans.

48

(4) Thus: 1st. As 3)15*l.* : 333*l.* 6*s.* 8*d.* :: 3)6*l.*

2

5 2

5)666 13 4

2ndly, inversely, As 9m. : £. 133 6 8 :: 12

9

12)1200 0 0

answer £. 100

(5) Thus: 1st. As 40cts. : 40m. :: 6060cts. : 6060m. 2nd. Inversely, as 2,00lb. : 6060m. :: 202,00lb. : 60m. For $6060 \times 2 = 12120$ which $\div 202 = 60$ miles. answer.

(6) Thus: 1st, As $32 \times 40 = 1280$: 8days :: $28 \times 40 = 1120$: 7days.

2nd, Inversely, as 145men : 7days :: 68men.

$$\begin{array}{r} 7 \\ \hline 1015 \div 68 = 14\frac{6}{68}\text{da.} \end{array}$$ or, 14D. $11\frac{7}{17}$hr. ans.

(7) Thus: 1st. As 276m. : 16 :: 852 : $49\frac{8}{17}$days For $852 \times 16 = 13632$ which $\div 276 = 49\frac{108}{276}$, or 49D. 4hr. 41+min.

2nd. Inversely, As 2)14hr. : 49da. 4hr. 41min. :: 2)12hr.

$$\begin{array}{r} 7 \\ \hline 6)345\ 8\ 47 \end{array}$$

answer 57D. 7hr. 27+min.

(8) Thus: First by a double stating Inverse,

As $\left\{\begin{array}{l} 9s.\text{ per bu.} \\ 15\text{ men.} \end{array}\right\}$ 6day $\left\{\begin{array}{l} 6s.\text{ per bu.} \\ 30\text{ men.} \end{array}\right\}$ $4\frac{1}{2}$ days.

For $9 \times 15 \times 6 = 810$ which $\div 6 \times 30 = 4\frac{1}{2}$ days for 3s. worth: Then, 2d. As 3s. : $4\frac{1}{2}$days :: 13s 4d. or, as 36d. : 9 half days. :: 160d. : 20days. For $160 \times 9 = 1440$ which $\div 36 = 40$ half days, or, 20 days. answer.

(9) Thus: 1st, Inversely, As 12m. : 100l. : 5m. : 240l.

$$\begin{array}{r} 100 \\ \hline 1200 \div 5 = 240l. \end{array}$$

2nd. As 8l. : 240l. :: 8l. 12s. : 258l. answer.

(10) Thus: 1st, As 50)100l. : 22w. 6d. :: 50)150l.

$$\begin{array}{r} 3 \\ \hline 2)68\ 4 \end{array}$$

weeks 34 2

Then 2nd, As 5men : 34w. 2d. :: 12men.

Inversely,

$$\begin{array}{r} 5 \\ \hline 12)171\ 3 \end{array}$$

answer w. 14 2 days.

Application.

mo. Bu. mo. Pers. Bu. Pers.

(1) Thus: As 4 : 7 :: 10 Then, as 7 : $17\frac{1}{2}$ :: 46

10 $\times 17\frac{1}{2}$

4)70 7)805

$17\frac{1}{2}$ Bushels. answer 115 Bu.

(2) Thus; As 60)60A. : 36men :: 60(240A.

— 4 —

1 — 4

144 men.

Then, Inversely, as 5days : 144men. :: 12 days

5

12)720

answer 60 men.

(3) Thus: As 3,00Pr. : 5men :: 9,00

9

45 ÷3=15 men.

Then, Inversely, as 4,0days : 15men :: 6,0days : 10men

4

60÷6=10men answer.

(4) Thus: As 50)150M. : 42s. :: 50M.

— 1 —

3 — 1

3)42

14s.

Then, as 3C. : 14s. :: 7C. 2qrs. 14lb. Or, As 112lbs. : 14s. :: 854lbs. : 35s. 7d. answer.

(5) From 8000 C.wt.
Take 4500

remains 3500 C.wt.

5)C.wt.Hor.5)C.wt.Hor.

Thus, 1st, as 45,00 : 18 :: 35,00 : 14

— 7 —

9 — 7

126÷9=14 horses in 6 days.

2nd. Inverse, as 6days : 14horses :: 3days : 28horses. For 14×6=84 which ÷3=28 horses. answer.

(6) Thus: 1st. As 2,0C. : 5£. :: 4,0C.

4

20÷2=10*l*.

Then, 2nd. As 5,0 : 10*l*. :: 10,0

10

100÷5=20*l*. answer.

(7) Thus: 1st. As 1yr. : 576Bu. :: 6yr.

6

3456 Bu.

Then, 2nd. As 48Bu. : 3456Bu. :: 240Bu.

— 5 —

1 5

17280 Bushels ans.

(8) Thus: 1st. As 40)80A. : 6days :: 40)200A.

— 5 —

2 5

30÷2=15 Dollars.

Then, 2nd. inverse. As 12men : 15days :: 25men : 7½days

12

180÷25=7⅕ days. answer.

£. *s. d.* £. £. *s. d.* £.

(9) First, 88 17 4—86=2 17 4=Interest of 86 for 8 months. Then, 1st. as 4)8m : 2*l* 17*s* 4*d*. :: 4)12m.

— 3 —

2 3

2)8 12 0

£. 4 6 0

2nd. As 86*l*. : 4*l* 6*s*. :: 100*l*. : 5*l*.

10

43 : 0

10

£.430÷86=5*l*. answer.

PRACTICE.

CASE 1.

EXAMPLES.

(2)

½	½	6812 at ½	
	12	3406	
	2,0	28,3 10	
		Facit £. 14 3 10	

(3)

¾	½	4712 at ¾	
	¼	2356	
		1178	
	12	3534	
	2,0	29,4 6	
		Facit £. 14 14 6	

(4)

¼	¼	15344 at ¼	
	12	3836	
	2,0	31,9 8	
		Facit £. 15 19 8	

(5)

½	½	7672 at ½	
	12	3836	
	2,0	31,9 8	
		Facit £. 15 19 8	

(6)

¾	½	9424 at ¾	
¼	½	4712	
		2356	
	12	7068	
	2,0	58,9	
		Facit £. 29 9	

CASE 2.

(2)

¼	¼	8612 at 1¼ *d.*	
		2153	
	12	10765	
	2,0	89,7 1	
		Facit £. 44 17 1	

(3)

d.			
2	½	1218 at 2½ *d.*	
½	¼	203	
		50 9	
	2,0	25,3 9	
		Facit £. 12 13 9	

(4)

d.		
3	¼	7812 at 3¾d.
¾	¼	1953
		488 3
	2,0	244,1 3

Facit £.122 1 3

(5)

d.		
4	⅓	8120 at 4d.
	2,0	270,6 8

Facit £.135 6 8

(6)

d.		
4	⅓	8121 at 5¼d.
1	¼	2707
¾	¼	676 9
		169 2¼
	2,0	355,2 11¼

Facit £. 177 12 11¼

(7)

d.		
6½	½	1218 at 6½d.
	½	609
		50 9
	2,0	65,9 9

Facit £. 32 19 9

(8)

d.		
6	½	6120 at 7½d.
1½	¼	3060
¼	⅒	765
		127 6
	2,0	395,2 6

Facit £. 197 12 6

(9)

d.		
6	½	7100 at 8d.
2	⅓	3550
		1183 4
	2,0	473,3 4

Facit £.236 13 4

(10)

d.		
6	½	4121 at 9¼d.
3	½	2060 6
¼	⅛	1030 3
		85 10¼
	20	317,6 7¼

Facit £. 158 16 7¼

(11)

d.		
6	½	1002 at 10¼d.
3	½	501
1½	½	250 6
		125 3
	2,0	87,6 9

Facit £. 43 16 9

(12) 6 | ½ | 2345 at 11¾*d.*

4	⅓	1172	6
1½	⅙	781	8
¼	1/24	293	1½
		48	10¼
2,0		229,6	1½

Facit £. 114 16 1¾

(13) *d.* 3 | ¼ | 6002 at 4½*d.*

1½	⅛	1500	6
		750	3
2,0		225,0	9

Facit £. 112 10 9

(14) *d.* 6 | ½ | 3001 at 9*d.*

3	¼	1500	6
		750	3
2,0		225,0	9

Facit £. 112 10 9

(15) *d.* 4 | ⅓ | 7182 at 5*d.*

1	¼	2394	
		598	6
2,0		299,2	6

Facit £. 149 12 6

(16) 6 | ½ | 3591 at 10*d.*

4	⅓	1795	6
		1197	0
2,0		299,2	6

Facit £. 149 12 6

(17) *d.* 4 | ⅓ | 6128 at 5½*d.*

1½	⅛	2042	8
		766	0
2,0		280,8	8

Facit £. 140 8 8

(18) *d.* 6 | ½ | 3064 at 11*d.*

4	⅓	1532	
1	¼	1021	4
		255	4
2,0		280,8	8

Facit £. 140 8 8

Or thus;

d. 1 | 1/12 | 3064 at 11*d.*

		255 4
2,0		280,8 8

Facit £. 140 8 8

CASE 3.

(2)

d.		
$1\frac{1}{2}$	$\frac{1}{8}$	6100 at $13\frac{1}{2}$
		762 6
2,0		686,2 6

Facit £. 343 2 6

(3)

d.		
2	$\frac{1}{6}$	1210 at $14\frac{3}{4}d.$
		201 8
$\frac{1}{2}$	$\frac{1}{4}$	50 5
$\frac{1}{4}$	$\frac{1}{2}$	25 $2\frac{1}{2}$
2,0		148,7 $3\frac{1}{2}$

Facit £. 74 7 $3\frac{1}{2}$

(4)

d.		
3	$\frac{1}{4}$	1260 at 15d.
		315
2,0		157,5

Facit £. 78 15

(5)

d.		
3	$\frac{1}{4}$	7121 at $16\frac{1}{4}d.$
1	$\frac{1}{3}$	1780 3
$\frac{1}{4}$	$\frac{1}{4}$	593 5
		148 $4\frac{1}{4}$
2,0		964,3 $0\frac{1}{4}$

Facit £. 482 3 $0\frac{1}{4}$

(6)

4	$\frac{1}{3}$	2340 at $17\frac{1}{2}d.$
$1\frac{1}{2}$	$\frac{1}{8}$	780
		292 6
2,0		341,2 6

Facit £. 170 12 6

(7)

d.		
6	$\frac{1}{4}$	7890 at $18\frac{3}{4}$
$\frac{3}{4}$	$\frac{1}{8}$	3945
		493 $1\frac{1}{2}$
2,0		1232,8 $1\frac{1}{2}$

Facit £. 616 8 $1\frac{1}{2}$

(8)

6	$\frac{1}{2}$	8900 at 19d.
1	$\frac{1}{6}$	4450
		741 8
2,0		1409,1 8

Facit £. 704 11 8

(9)

6	$\frac{1}{2}$	7120 at $20\frac{1}{4}$
2	$\frac{1}{3}$	3560
$\frac{1}{4}$	$\frac{1}{8}$	1186 8
		148 4
2,0		1201,5 0

Facit £. 600 15 0

(10)

d.		
6	$\frac{1}{2}$	2100 at $21\frac{1}{2}d.$
3	$\frac{1}{4}$	1050
$\frac{1}{2}$	$\frac{1}{10}$	525
		87 6
2,0		376,2 6

Facit £. 188 2 6

(11)

d.		
4	$\frac{1}{2}$	6812 at $22\frac{3}{4}d.$
6	$\frac{1}{2}$	2270 8
$\frac{3}{4}$	$\frac{1}{18}$	3406 0
		425 9
2,0		1291,4 5

Facit £. 645 14 5

(12)

	d.		
	6	½	9999 at 23¾*d.*
	4	⅓	4999 6
	1	¼	3333 0
of 6*d.*	¾	⅛	833 3
			624 11¼
	2,0		1978,9 8¼

Facit £. 989 9 8¼

(13)

	d.		
	6	½	19998 at 23¾*d.*
	4	⅓	9999
	1	¼	6666
of 6*d.*	¾	⅛	1666 6
			1249 10½
	2,0		3957,9 4½*d.*

Facit £. 1978 19 4½

(14)

	d.		
	2	⅒	12345 at 14*d.*
			2057 6
	2,0		1440,2 6

Facit £. 720 2 6

(15)

	d.		
	4	⅓	9876 at 17½*d.*
	1½	⅛	3292
			1234 6
	2,0		1440,2 6

Facit £. 720 2 6

(16)

	d.		
	6	½	7910 at 19½*d.*
	1½	¼	3955
			988 9
	2,0		1285,3 9

Facit £. 642 13 9

(17)

	d.		
	4	⅓	6780 at 22¾*d.*
	6	½	2260
	¾	⅛	3390
			423 9
	2,0		1285,3 9

Facit *l.* 642 13 9

CASE 4.

(2)

	121 at 3*s.*
	3
2,0	36,3

Facit £. 18 3

(3)

s.		
5	¼	471 at 5*s.*

£. 117 15

(4) 191 at 8*s.*

4 4

Fac. £. 76 8

(5) 242 at 11*s.*

11

2,0)266.2

Facit £. 133 2

(6) 600 at 13*s*

13

2,0)780,0

Facit £. 390

(7) 171 at 16*s.*

8 8

Fac. £. 136 16

(8) 2,0)100 at 19*s.*

—5

Facit £. 95

(9) 612 at 9*s.*

9

2,0)550,8

Facit £. 275 8

(10) 306 at 18*s.*
9 9
Facit £. 275 8

(11) 860 at 7*s.*
7
2,0)602,0
Facit £. 301 0

(12) 430 at 14*s.*
7 7
Facit £. 301 0

CASE 5.

(2) |2 *s.* |6 *d.* | 1/8 | 569 at 2 *s.* 6 *d.*
Facit £. 71 2 6

(3) |3 *s.* |4 *d.* | 1/6 | 69 at 3 *s.* 4 *d.*
Facit £. 11 10

(4) |6 *s.* |8 *d.* | 1/3 | 478 at 6 *s.* 8 *d.*
Facit £. 159 6 8

(5) |10 *s.* | | 1/2 | 400 at 13 *s.* 4 *d.*
|3 |4 | 1/3 | 200
66 13 4
Facit £. 266 13 4

(6) |10 *s.* | | 1/2 | 789 at 16 *s.* 8 *d.*
|6 |8 | 1/3 | 394 10
263 0
Facit £. 657 10

(7) |5 *s.* | | 1/4 | 765 at 5 *s.* 9 *d.*
| |6 | 1/10 | 191 5
| |3 | 1/2 | 19 2 6
9 11 3
Facit £. 219 18 9

(8) |2 *d.* | 1/6 | 841 at 13 *s.* 2 *d.*
13
10933
140 2
2,0)1107,3 2
Facit £. 553 13 2

(9) |4 *d.* | 1/3 | 807 at 16 *s.* 5 *d.*
16
12912
|1 | 1/4 | 269
67 3
2,0)1324,8 3
Facit £. 662 8 3

(10) |1 *d.* | 1/12 | 969 at 19 *s.* 11 *d.*
2,0 8,0 9
deduct 4 0 9 price at 1 *d.*
Facit £. 964 19 3

(11)

s.	d.		
5		¼	244 at 5 8½
	6	1/10	61
	2	⅓	6 2
	½	¼	2 0 8
			0 10 2

Facit £. 69 12 10

(12)

d.		
4	⅓	875 at 1s. 4¼d.
½	⅛	291 8
¼	½	36 5½
		18 2¾
2,0		122,1 4¼

Facit £. 61 1 4¼

(13)

4d	⅓	7524 at 3s 5½d.
		3
1⅓	⅛	22572
		2508
		940 6
2,0		2602,0 6

Facit £. 1301 0 6

(14)

3d	¼	3715 at 9s 4d.
		9
1½	½	33435
		928 9
		464 4½
2,0		3482,8 1½

Facit 1741 8 1½

(15)

6d	½	2572 at 13s 7½d.
		13
1½	¼	33436
		1286
		321 6
2,0		3504,3 6

Facit £. 1752 3 6

(16)

6d	½	5144 at 6s 9¾d.
		6
3	½	30864
¾	¼	2572
		1286
		321 6
2,0		3504,3 6

Facit £. 1752 3 6

(17)

½		4567 at 19s 11d.½
		12228 3 2
2,0		19,0 3½

deduct 9 10 3½ price at ½

Facit £. 4557 9 8½

(18)

4	⅓	9134 at 9 11¾
		9
6	½	82206
		3044 8
1½	¼	4567 0
	1/12	1141 9
		190 3⅓
2,0		9114,9 8½

Facit £. 4557 9 8½

CASE 6.

(2) 26×11 at 11*l* 14*s*.

7

18 4
286 0

Facit 304 4

(3) 36×5 at 5*l* 13*s*.

13

2,0)46,8
23 8
180 0=36×5*l*.

Facit £. 203 8

(4)

s.	*d.*			*l.* *s.* *d.*
3	4	⅙	47 at	3 3 4

3
141
+ 7 16 8

Facit *L.* 148 16 8

(5)

s.	*d.*			*l.* *s.* *d.*
6	8	⅓	156 at	3 6 8

3
468
52

Facit £. 520

(6)

s.	*d.*			*l.* *s.* *d.*
10		½	78 at	6 13 4
			6	
			468	
3	4	⅓	39	
			13	

Facit £. 520

(7)

s.	*d.*			*l.* *s.* *d.*
10	0	½	457 at	14 17 9½
			14	
6	8	⅓	6398	
1		⅒	228 10	
			152 6 8	
	1½	⅛	22 17 0	
			2 17 1½	

Facit £. 6804 10 9½

(8)

d.			*l.* *s.* *d.*
4⅓		914 at	7 8 10¾
		148	20
6½		7312	148
		12796	
		304	8
¾	⅛	457	0
		57	1½
2,0		13609,0	9½

Facit £. 6804 10 9½

(9) 500 at £. *s.* *d.* 12 19 11½

10

By compound mul. 129 19 7

10

1299 15 10

5

Facit £. 6498 19 2

(10) 1000 at £. 6 s. 9 11¾

10

64 19 9½

10

649 17 11

10

Facit £. 6498 19 2

CASE 7.

(2) C. qr. lb. 12 2 14 at £. 3 s. 14 d. 0

12

qr. lb.

2 | ½ | 44 8 0

14 | ¼ | 1 17 0

0 9 3

Facit £. 46 14 3

(3) C. qr. lb. 37 2 14 at £. 7 s. 10 d. 9 × 1

4×9+1=37

30 3 0

9

qr. lb. 271 7 0

2 | ½ | 7 10 9

278 17 9½

14 | ¼ | 3 15 4½

0 18 10

Facit £. 283 11 11½

(4) C. qr. lb. 9 2 26 at £. 4 s. 10 d. 4½

qr. lb. 9

of 1 c. wt. 2 | ½ | 40 13 4½

16 | ⅞ | 2 5 2¼

8 | ½ | 0 12 10¼

2 | ¼ | 0 6 5¼

0 1 7½

Facit £. 43 19 6

(5) C. qr. lb. 5 2 10 at £. 2 s. 18 d. 6½

qr. lb. 5

of 2 qr. 2 | ½ | 14 12 8½

8 | ⅞ | 1 9 3¼

2 | ¼ | 0 4 2

0 1 0½

Facit £. 16 7 2¼

(6) 59 C. 1 qr. 14 lb. at 1 8 7 d. × 3

7×8+3

qr. lb.

1 | ¼ | 10 0 1

8

80 0 8

4 5 9

14 | ½ | 0 7 1¾

0 3 6¾

Facit £. 84 17 1½

(7) C. qr. lb. £. s. d.
72 3 27 at 8 11 5
qr. lb. 9×8=72

	2	½	77	2	9
					8
1		½	617	2	0
of 1 c. wt.	16	¼	4	5	8½
	8	½	2	2	10½
	2	¼	1	4	5¾
	1	½	0	12	2¾
			0	3	0⅞
			0	1	6¼

Facit £. 625 11 10

(8) qr. lb. £. s. d.
2 14 at 3 7 6
qr. lb.

of 2 qr.	2	½	1	13	9
	14	¼	0	8	5¼

Facit £. 2 2 2¼

(9) lbs. £. s. d.
24 at 4 17 0
lbs.

16	⅛	0	13	10¼
8	½	0	6	11

Facit £. 1 0 9½

(10) lb. £. s. d.
17 at 3 5 4
lb.

14	⅛	0	8	2
2	⅐	0	1	2
1	½	0	0	7

Facit £. 0 9 11

(11) lb. oz. s. d.
27 10 at 1 4
oz. 3

6	½	4	0	
				9
4	⅓	1	16	0
		0	0	8
		0	0	5¼

Facit £. 1 17 1¼

(12) lb. oz. dwt. gr. £. s. d.
13 10 12 8 at 4 7 6×1
oz. dwt. gr. 12+1=13

	6			½	52	10	0
	4			⅓	4	7	6
of 4 oz.					2	3	9
		10		⅛	1	9	2
of 2 dwt.		2		⅓	0	3	7¾
			8	⅒	0	0	8¾
					0	0	1¼+

Facit £. 60 14 10¾

(13) oz. dwt. gr. *L. s. d.*
17 6 16 at 3 16 8 × 1 per oz.
4 × 4 + 1 = 17

15 6 8
4

of 1oz.	dwt.	gr.				
	5		¼	61	6	8
	1		⅕	3	16	8
		12	½	0	19	2
		4	⅓	0	3	10
				0	1	11
				0	0	7½

Facit 66 8 10½

(14) yds. qr. *s. d.*
67 2 at 12 2 × 1
6 × 11 + 1

qr.				
2	½	3	13	0
			11	
		40	3	0
		0	12	2
			6	1

Facit £. 41 1 3

(15) yds. qr. *s. d.*
68 1 at 8 1 × 2
6 × 11 + 2

qr.				
1	¼	2	8	6
			11	
		26	13	6
		0	16	2
			2	0¾

Facit £. 27 11 8¼

(16) yds. qr. *s. d.*
419 3 at 12 6

s.	d.					qr.			
10		½	209	10		2	½	6	3
2	6	¼	52	7	6	1	¼	3	1½
				9	4½				

Facit £. 262 6 10½ *s.* 9 4½

(17) yds. qr.
839 2 at 6*s* 3*d.*
1

of 2*s.*	*d.*				
	3	½	83	18	at 2*s.*
				3	
			251	14	
			10	9	9
				3	1½ for 2 qrs.

Facit £. 262 6 10½

(18) A. R. P. £. s. d.
476 3 28 at 3 7 11×6
10

R. P.

			33 19 2×7
			10
2		½	339 11 8
			4
			1358 6 8
			237 14 2
			20 7 6
1		½	1 13 11½
	20	½	0 16 11¾
of 1 R.	8	⅘	0 8 5¾
			0 3 4¾

Facit £. 1619 11 1¾

(19) A. R. P. £. s. d.
953 3 16 at 1 13 11½×3
10

R. P.

			16 19 7×5
			10
2		½	169 15 10
			9
			1528 2 6
			84 17 11
			5 1 10½
1		¾	0 16 11¾
of 1 acre	16	1/10	8 5¾
			3 4¾

Facit £. 1619 11 1¾

Application.

(1)

¼	¼	18848 at ¾
		4712
		12)14136
		2,0) 117,8

Facit £. 58 18

(2)

1½	⅛	6789 at 1¾
¼	⅛	848 7⅛
		141 5¼
		2,0) 99,0 0¾

Facit £. 49 10 0¾

(3)

	½	3906 at 7½d.
1½	¼	1953
		488 3
		2,0)244,1 3

Facit £. 122 1 3

(4)

1½	⅛	2004 at 10½d.
		250 6
		2,0)175,3 6

Facit £. 87 13 6

(5)

3	¼	12240 at	1 3½
½	⅛	3060	
		510	
		2,0)1581,0	

Facit £. 790 10

(6)

	6	½	1234 at 1 11¾
	4	⅓	617
	1	¼	411 4
of 6 d.	¾	⅛	102 10
			77 1½
			2,0)244,2 3½

Facit £. 122 2 3½

(7) s. gal. s.
|4 |1/5 |987 at 4
Facit £. 197 8

(8) gal. s.
543 at 11
11
2,0)597,3
Facit 298,13

(9) s. d. bu. s. d.
|6 |8 |1/3|138 at 6 8
Facit £. 46

(10) s. bu. s. d.
|10| |1/2|800 at 13 4
3|4|1/3|400
133 6 8
Facit £. 533 6 8

(11) s. d. bu. s. d.
|2|6|1/8|875 at 2 9 1/2
3|1/2|109 7 6
1/2|1/16| 10 18 9
1 16 5 1/2
Facit £. 122 2 8 1/2

(12) s. d. Tons £. s. d.
|6|8|1/3| 94 at 6 6 8
6
564
31 6 8
Facit £. 595 6 8

(13) s. d. T. L. s. d.
|10| |1/2| 156 at 13 16 8
13
6|8|1/3|2028
78
52
Facit £. 2158

(14) T. £. s. d.
2000 at 6 9 11 3/4
10
By comp. mul. 64 19 9 1/2
10
649 17 11
10
6498 19 2
2
Facit L. 12997 18 4

(15) 4000 Tons at 12l 19s 11 1/2 d.
Say 4000 at 13l. = 52000l.
4000 at 1/2 = 8 6 8 Subtract.
Facit L. 51991 13 4

(16) C.qr. lb. L. s. d.
8 1 16 at 5 17 9
qr. lb. 8
of 1 c. wt. |1| |1/4| 47 2 0
|16|1/4| 1 9 5 1/4
0 16 9 3/4
Facit L. 49 8 3

SIMPLE INTEREST.

CASE 1.

EXAMPLES.

(2) £. s. d.
87 14 5 at 6*l.*
6
5,26 6 6
20
5,26
12
——ans. £. s. d. 5 5 3
3,18

(3) £. s. d.
173 17 8½ at 7*l.*
7
12,17 3 11½
20
3,43
12
5,27
4
1,10

£. s. d.
173 17 8½ Prin.
12 3 5¼ Int.
£. 186 1 1¾ amo.

(4) £. s. d.
176 13 9 at 5*l.*

£.
5 | 1/20 | 8 16 8¼ = Int. for 1 year.
9
79 10 2¼ do. for 9 yr.
176 13 9 Principal.
£. 256 3 11¼ = amount.

CASE 2.

EXAMPLES.

(2) £. £. s. d.
5 | 1/20 | 427 18 9 at 5¾*l.*

1/2	1/20	21	7	11¼
1/4	1/2	2	2	9½
		1	1	4¾
		24	12	1½
				2

Facit £. 49 4 3

(3) £. £. s. d.
5 | 1/20 | 1096 15 6 at 6½*l.*

1	1/3	54	16	9¼
1/2	1/2	10	19	4¼
		5	9	8

Int. for 1 yr. = £. 71 5 9½
4
do. for 4yr. = 285 3 2
Principal 1096 15 6 } +
amount £. 1381 18 8 ans.

CASE 3.

EXAMPLES.

(2)

		£.	
5	$\frac{1}{20}$	57 17 8	for 3 mo. at 6*l.*
1	$\frac{1}{3}$	2 17 $10\frac{1}{2}$	
		0 11 $6\frac{3}{4}$	
mo.			
3	$\frac{1}{4}$	3 9 $5\frac{1}{4}$	Int. for a yr.
		£. 0 17 $4\frac{1}{4}$	do. for 3 mo.

answer £. 0 17 $4\frac{1}{4}$ do. for 3 mo.

(3)

		£.	£. *s.* *d.*	
5	$\frac{1}{20}$	150	19 0	for $3\frac{1}{3}$ yr. at 6*l.*
1	$\frac{1}{3}$		7 10 $11\frac{1}{4}$	
			1 10 $2\frac{1}{4}$	
mo.				
4	$\frac{1}{3}$		9 1 $1\frac{1}{2}$	Int. for 1 yr.
			3	
			27 3 $4\frac{1}{2}$	do. for 3 yr.
			3 0 $4\frac{1}{2}$	do. for 4 mo.

answer £. 30 3 9 do. for $3\frac{1}{3}$ yr.

(4)

	£. *s.*	
$\frac{1}{2}$	126 12	for 16 weeks at $4\frac{1}{2}$£.
	4	
	506 8	
	63 6	
£.	5 69 14	
	20	
s.	13 94	
	12	
d.	11 28	
	4	
qr.	1 12	

w.	£.	*s.*	*d.*	w.
Then, as 52	: 5	13	$11\frac{1}{4}$	:: 16 Or, as
52w.	: 5469qrs.	::	16w.	: 1682qrs.

For 5469 × 16 = 87504 which ÷ 52 = 1682qrs. or 1*l* 15*s* $0d\frac{1}{2}$.

(5)

		£.	s.	
¾	½	243	17	for 146 days at 5¾*l.*
			5	
¼	½	1219	5	
		121	18	6
		60	19	3
£.	14	02	2	9
		20		
		0	42	&c. £. 14 0 5 Int. for 1yr.

Then, As 365days : 14*l* 0*s* 5*d*. :: 146days, Or, as 365 days : 3365*d*. :: 146days : 1346*d*. For 3365 × 146=491290 which ÷ 365=1346*d*. or, 5*l* 12*s* 2*d*. And 243*l* 17*s*. Prin.+5*l* 12 2*d*. Int.=249*l* 9*s* 2*d*. amount answer.

(6)

£.			£.	s.	d.	
5	1/20		71	3	11½	for 1 yr. 5mo. & 25da. at 6*l.*
1	1/5		3	11	2¼	
			0	14	2¾	
mo.						
4	1/3		4	5	5	Interest for 1 year.
1	1/4		1	8	5½	do. for 4 mo.
15	1/2		0	7	1¼	do. for 1 mo.
of 1 mo. 10	1/3		0	3	6½	do. for 15 days.
			0	2	4¼	do. for 10 do.
answer		£.	6	6	10½	do. for 1yr. 5mo. 25days.

(7) £. *s.* *d.*
116 17 2 for 6 years, 7 mo. & 19da at 7*l.* per cent.

				mo.	day.	£.	s.	d.	
			7						
£.	8	18	0	2	6	½	8	3	7 Int. for 1 year.
		20						6	
s.	3	60							
		12				49	1	6	do. for 6 yr.
d.	7	22			1	⅙	4	1	9½ do. for 6 mo.
							0	13	7½ do. for 1 mo.

As 365da. : 8*l* 3*s* 7*d*. :: 19da. = 8 6 do. for 19days.

	54	5	5 Interest.
	116	17	2 Principal.
answer £.	171	2	7 amount.

(9)

	mo.	days.
2)	71	28
½ time=	35½	14

	£.	s.	d.
½)	674	13	8¾
		5×7=35	
	3373	8	7¾

d.						
10	⅓	2361	4	0	6¼	22
		337	6	10¼		4
2	⅕	22	4	17	10¾	4
		4	4	19	6¾	—
		4	4	19	6¾	30÷3=

	£.	s.	d.
	242	13	2¾
		10	deduct.

£. 242|66 4 4¾ Inter.= 242 12 4¾
20 Prin. = 674 13 8¾

s. 13|24 amount £.917 6 1½
12

d. 2|92
4

qrs. 3|71

(10) 571 dols.
30 days.

6,0)1551,0

dols. 2,58½

(11) 325 dols.
64 days.

1300
1950

6,0)2080,0

dols. 3,46+

(12)

	31	3da.	
	— 5		
July	26	1	
August	31		
Sept.	30		
Octo.	31		
Novm.	30		
Decem.	31		
January	9		
3,0)	18,8		
2)	6 8		
mo.	3 4=½time.		

		£.	100×3
		30	0
⅓		1	0
		3	6 8
	£.	3	13 6 8
		20	
	s.	2	66
		12	
	d.	8	00

	£.	s.	d.
	3	2	8
31÷3=	—		10⅔
answer £.	3	1	9⅔

(13) 2)12 mo. 60)135 days.

6mo. $2\frac{1}{4}$ mo.

Then $\frac{1}{4})240l. \times 2\frac{1}{4}$

6

1440

48|0

6|0

L. 19|80

20

19 16 0

54÷3= 1 6 subtract.

1*L.*=$\frac{1}{8}$)19 14 6 Interest at 6 per cent.

3 5 9 do. at 1 do.

answer *L.* 23 0 3 do. at 7 per cent.

(14) $\frac{1}{2}$)12mo. 213days.

6 3,0)106$\frac{1}{2}$

3 16$\frac{1}{2}$

days.

15	$\frac{1}{2}$	*L.* 371×3
		6
		2226
		1113
1$\frac{1}{2}$	$\frac{1}{10}$	18 5 10
		1 8 11
		L. 35|43 1

then £. 35|43 1

20

s. 8|61

12

d. 7|32

4

qr. 1|28

£.	*s.*	*d.*	
35	8	7$\frac{1}{4}$	
130÷3=	0	3	7$\frac{1}{4}$ subtract.
answer *L.*	35	5	0

(15) $\frac{1}{2}$)12mo. 73days.

mo. da.

mo. 6 36$\frac{1}{2}$÷30=1 6$\frac{1}{2}$

L.	*s.*	*d.*	
325	15	6	×1
		6	

days.	195	4	13	0
6	$\frac{1}{5}$	32	5	15 6
$\frac{1}{2}$	$\frac{1}{12}$	6	5	3 1
			5	8 7
L.		23	51	0 2

then 23|51 0 2

20

s. 10|20

12

d. 2|42

4

qr. 1 68

L.	*s.*	*d.*	
23	10	2$\frac{1}{4}$	
38÷3=	0	1	0$\frac{1}{2}$ deduct

1*L.*=$\frac{1}{6}$)23 9 1$\frac{3}{4}$ at 6 per cent.

3 18 2$\frac{1}{4}$ at 1 do.

answer *L.* 27 7 4 Int. at 7 per.

(16) mo. £. s. d.
½)11 ⅓)148 12 6½
5½ 5½
743 2 8½
74 6 3¼
£. 8|17 8 11¾
20
s. 3|48
12
d. 5|87
4
qr. 3|51
answer £. 8 3 5¾ Interest.

(17) mo. £. s. d.
½)17 ½)333 13 3¾
8½ 8½
2669 6 6
166 16 7¾
£. 28|36 3 1¾
20
s. 7|23
12
d. 2|77
4
qr. 3|11
333 13 3¾ Principal.
28 7 2¾ Interest.
answer £. 362 0 6½ amount.

yr. days.
(18) From 18 0
Take 15 219
mo. da.
2 146=24 146
and 2)24 146
mo. da.
12 73÷30=2 13.
£. s.
Then multi. 651 11×2
by 12
days.
10 | ⅓ | 781 8 12
| | 130|3 2
3 | 1/10 | 21|7 3 8
| | 6|5 3 1
L. 94|04 0 9

(19) mo. da. L. s. d.
2)71 25 ½)517 12 8½
35½ 12½ 5
2588 3 6½
7
days.
10 | ⅓ | 1811 7 4 9½
| | 25|8 16 4¼
2½ | ¼ | 17|2 10 10¾
| | 4|3 2 8½
L. 185|91 14 9

(17) answer then
£. 94|94 0 9
20
s. 0|80
12
d. 9|69
4
qr. 2|76
L. s. d.
94 0 9½
157÷3= 0 4 4¼ sub.
1l.=½)93 16 5¼ Int. at 6l.
15 12 8¾ do. at 1l.
109 9 2 do at 7l.
651 11 0 Principal.
answer l. 761 0 2 amount.

(19) then
L. 185|91 14 9
20
s. 18|34
12
4|17
4
|68
l. s. d.
185 18 4
21÷3= 7 deduct.
ans. l. 185 17 9

(20) $5794 \times 7 \div 100 \div 4 \div 12$ answer 8*s* $5\frac{1}{4}$*d.*

(21)

£. mo.

$\frac{1}{2}$)60 for $7 \div 2 = 3\frac{1}{2}$

$3\frac{1}{2}$

180

30

L. 2|10

20

s. 2|00

£. mo.

$\frac{1}{2}$)150 for $15 \div 2 = 7\frac{1}{2}$

$7\frac{1}{2}$

1050

75

l. 11|25

20

s. 5|00

l. *s.* mo.

$\frac{1}{2}$)75 10 for $9 \div 2 = 4\frac{1}{2}$

$4\frac{1}{2}$

302 0

37 15

l. 3|39 15

20

s. 7|95

12

d. 11|40

4

qr. 1|60

l. *s.* mo.

145 15 for $27 \div 2 = 13\frac{1}{2}$.

$12 + 1\frac{1}{2} = 13\frac{1}{2}$

$1\frac{1}{2}$|$\frac{1}{8}$|1749 0

218 12 6

l. 19|67 12 6

20

s. 13|52

12

d. 6|30

4

qr. 1|20

£. *s.* mo.

$\frac{2}{4}$|$\frac{1}{2}$| 397 12 for $45\frac{1}{2} \div 2 = 22\frac{3}{4}$

2

795 4

11

8747 4

$\frac{1}{4}$|$\frac{1}{2}$| 198 16

99 8

£. 90|45 8

20

s. 9|08

12

d. 0|96

4

qrs. 3|84

£.	Collectively.	£.	*s.*	*d.*
60	$\times 3\frac{1}{2} =$	2	2	0
150	$\times 7\frac{1}{2} =$	11	5	0
75 10	$\times 4\frac{1}{2} =$	3	7	$11\frac{1}{4}$
145 15	$\times 13\frac{1}{4} =$	19	13	$6\frac{1}{4}$
397 12	$\times 22\frac{3}{4} =$	90	9	$0\frac{3}{4}$
828 17 prin.	£.	126	17	$6\frac{1}{4}$ + whole Int.
		828	17	0 Prin.
	answer £.	955	14	$6\frac{1}{4}$ + amount

INSURANCE COMMISSION, &c.

CASE 4.

EXAMPLES.

(2) £ s. d.
7406 17 6 at 15¼ per cent.
12

¾ | 88882 10 0
¼ | 22220 12 6
5555 3 1½
£. 1166|58 5 7½
20
s. 11|65
12
d. 7|87
4
qr. 3|50

£. s. d.
answer 1166 11 7¾

(3) £. s. d.
½ | 704 15 4 at 1¾ l.
¼ | 352 7 8
176 3 10
£. 12|33 6 10
20
s. 6|66
12
d. 8|02

£. s. d.
answer 12 6 8

(4) £. s. d.
£. 7|00 14 6 at 4s. per ct.
20
s. 0|14
12
d. 1|74
4
qrs. 2|96

s. £.
4 | 5 | 7 0 1½ at 1l. per. ct.
£. 1 8 0¼ answer.

(5) £. s. d. s. d.
5 | ¼ | 420 12 6 at 6 4 per cts.
1 | ¼ | 105 3 1½
4d | ⅓ | 21 0 7½
7 0 2½
£. 1|33 3 11½
20
s. 6|63
12
d. 7|67
4
qrs. 2|70

answer 1l. 6s. 7½d.

(6) 85600 dol. × 35 = 2996000 which ÷ 100 = 29960 dol. ans.

CASE 5.

EXAMPLES.

(1) £. s.
$\frac{1}{2}$)4 10 per cent per ann.
$9\frac{1}{2}$
40 10
2 5
42 15
100 0

Then, as 142 15 : 100 :: 856 10 Or,
as 2855*s.* : 100*l.* :: 17130*s.* : 600*l.*
For 17130×100=1713000, which
÷2855=600*l.* answer.

£. 142 15 amount of 100*l.* for $9\frac{1}{2}$ years.

CASE 6.

(2) 856dol. 50ct.—600dol.=256dol. 50ct. whole Interest. Then, as 600dol. : 256dol. 50ct. :: 100dol. : 42dol. 75ct. for $9\frac{1}{2}$ years. Then, as $9\frac{1}{2}$yrs. : 42dol. 75ct. :: 1 yr. : 4dol. 50ct. per cent. answer.

CASE 7.

(2) $\frac{1}{2}$)600 at $4\frac{1}{2}$
4
2400
300
£. 27|00

£. s.
From 856 10
Take 600 0 yr.mo.
27)256 10(9 6
243
13
12+6 for 10
ans. 9yr.6m. 162
162

(3) 2000
× 5
dols. 100,00

From 2925 amount,
Take 2000 principal,
925 whole Interest,
Then, as 100dols. : 1yr. :: 925dols. : $9\frac{1}{4}$yr. or 9 yr. 3mo.
Lastly, 21yr.—9yr. 3mo.=11yr. 9mo. answer.

COMPOUND INTEREST.

(2)

		L.	s.	d.	
5l.	1/20	400	0	0	
1	1/5	20	0	0	
		4	0	0	
5	1/20	424	0	0	amt. 1 yr.
1	1/5	21	4	0	
		4	4	9 1/2	
5	1/20	449	8	9 1/2	amt. 2 yrs.
1	1/5	22	9	5 1/4	
		4	9	10 1/2	
5	1/20	476	8	1 1/4	amt. 3 yrs.
1	1/5	23	16	4 3/4	
		4	15	3 1/4	

ans. 504 19 9¼ amt. 4 yrs.

(3) dols.

5=1/20)1280 Principal.
+ 64
1/20)1344
67,2
1/20)1411,20
70,56
1/20)1481,76
74,08,8
1/20)1555,84,8
77,79,2+
1/20)1633,64,0
81,68,2

From 1715,32,2 amount
Take 1280,00,0 Principal
answer 435,32,2 comp. Int.

(4) £.

1/4)500 at 4¼ per cent.

4
2000
125
£. 21|25
20
s. 5|00

£.	s.
500	0
21	5

1/4) 521 5 = amount 1 year.

4¼
2085 0
130 6 3
£.22|15 6 3
20
s. 3|06
12
d. 0.75
4
3|00

£.	s.	d.	
521	5	0	
22	3	0¾	
1/4)543	8	0¾	amount 2 yr.
		4¼	
2173	12	3	
135	17	0	
£. 23|09	9	3	

20
s. 1|89
12
d. 10|71
4
qrs. 2|84

£.	s.	d.	
543	8	0¾	
23	1	10 1/2	
1/4)566	9	11¼	amount 3 yr.
		4¼	
2265	19	9	
141	12	5¾	
£. 24|07	12	2¾	continued,

(4) continued, £. 24|07 12 $2\frac{3}{4}$

20

s. 1|52

12

d. 6|26.

4

qrs. 1|94

£.	s.	d.
566	9	$11\frac{1}{4}$
24	1	$6\frac{1}{2}$

ans. 590 11 $5\frac{1}{2}$ amt. for 4yrs.

(5)

$\frac{1}{2}$)400 10 at $3\frac{1}{2}$ per cent.

$3\frac{1}{2}$

1201 10

200 5

£. 14|01 15

20

s. 0|35

12

d. 4|20

£.	s.	d.
400	10	0
14	0	4

$\frac{1}{2}$)414 10 4 amt. 1 year.

$3\frac{1}{2}$

1243 11 0

207 5 2

£. 14|50 16 2

20

s. 10|16

12

d. 1|94

4

qrs. 3|76

£.	s.	d.
414	10	4
14	10	$1\frac{3}{4}$

$\frac{1}{4}$)429 0 $5\frac{3}{4}$ amt. 2 yrs.

$3\frac{1}{2}$

1287 1 $5\frac{1}{4}$

214 10 $2\frac{3}{4}$

£. 15|01 11 8

20

s. 0|31

12

d. 3|80

4

qrs. 3|20

£.	s.	d.
429	0	$5\frac{3}{4}$
15	0	$3\frac{1}{4}$
444	0	$9\frac{1}{2}$ amt. 3 yr.
—400	10	0 Principal.

ans. *l.* 43 10 $9\frac{1}{2}$ comp. Int.

COMPOUND INTEREST.

(2)

		L.	s.	d.	
5	1/20	400	0	0	
1	1/5	20	0	0	
		4	0	0	
5	1/20	424	0	0	amt. 1 yr.
1	1/5	21	4	0	
		4	4	9 1/2	
5	1/20	449	8	9 1/2	amt. 2 yrs.
1	1/5	22	9	5 1/4	
		4	9	10 1/2	
5	1/20	476	8	1 1/4	amt. 3 yrs.
1	1/5	23	16	4 1/4	
		4	15	3 1/4	

ans. 504 19 9 1/4 amt. 4 yrs.

(3)

dols.

5 = 1/20) 1280 Principal.
+ 64
1/20) 1344
67,2
1/20) 1411,20
70,56
1/20) 1481,76
74,08,8
1/20) 1555,84,8
77,79,2 +
1/20) 1633,64,0
81,68,2

From 1715,32,2 amount
Take 1280,00,0 Principal
answer 435,32,2 comp. Int.

(4)

L.
1/4) 500 at 4 1/4 per cent.
4
2000
125
L. 21|25
20
s. 5|00

L.	s.
500	0
21	5

1/4) 521 5 = amount 1 year.

		4 1/4
2085	0	
130	6	3

L. 22|15 6 3
20
s. 3|06
12
d. 0|75
4
qrs. 3|00

L.	s.	d.
521	5	0
22	3	0 3/4
1/4) 543	8	0 1/4 amount 2 yr.
		4 1/4
2173	12	3
135	17	0
L. 23|09	9	3

20
s. 1|89
12
d. 10|71
4
qrs. 2|84

L.	s.	d.	
543	8	0 3/4	
23	1	10 1/2	
1/4) 566	9	11 1/4	amount 3 yr.
		4 1/4	
2265	19	9	
141	12	5 3/4	
L. 24|07	12	2 3/4	continued,

(4) continued, £. 24|07 12 2¾

20

s. 1|52

12

d. 6|26.

4

qrs. 1|94

£.	s.	d.
566	9	11¼
24	1	6¼

ans. 590 11 5½ amt. for 4yrs.

(5)

£.	s.	
½)400	10	at 3½ per cent.
		3½
1201	10	
200	5	
£. 14|01	15	

20

s. 0|35

12

d. 4|20

£.	s.	d.	
400	10	0	
14	0	4	
½)414	10	4	amt. 1 year.
			3½
1243	11	0	
207	5	2	
£. 14|50	16	2	

20

s. 10|16

12

d. 1|94

4

qrs. 3|76

£.	s.	d.	
414	10	4	
14	10	1¾	
¼)429	0	5¾	amt. 2 yrs.
			3½
1287	1	5¼	
214	10	2¾	
£. 15|01	11	8	

20

s. 0|31

12

d. 3|80

4

qrs. 3|20

£.	s.	d.	
429	0	5¾	
15	0	3½	
444	0	9½	amt. 3 yr.
—400	10	0	Principal.

ans. *l.*43 10 9½ comp. Int.

REBATE OR DISCOUNT.

EXAMPLES.

(2) mo. D. c. m.
6 | 1/2 | 5 00 0
1 | 1/6 | 2 50 0
41 6
7 91 6
100
amount 107 91 6

Then, as 107dols.91ct.6m. : 100 :: 430dols. 67ct. : 399dols. 07ct. + For 430,67 × 100 = 43067,00 which ÷ 107,916=399dols. 07ct. present worth.

(3) mo. £. s. d.
4 | 1/3 | 3 10 0
1 3 4
100 0 0
£. 101 3 4

Then, as 101*l* 3*s* 4*d*. : 100*l*. :: 795*l*. 11*s* 2*d*. Or, as 24280*d*. : 100*l*. :: 190934 : 786*l* 7*s* 8*d*. For 190934×100=19093400 which ÷24280=786*l* 7*s* 8*d*. answer.

L. s. d.
(4) |6|1/2|7 0 0 for 12 mo.
|2|1/3|3 10 0
| | |1 3 4
100 0 0
L. 111 13 4

Then, as 111*l* 13*s* 4*d*. : 100*l*. :: 112*l* 12*s*. Or, as 26800*d*. : 100*l*. :: 27024*d*. ; 100*l* 16*s* 8½*d*. For 27024×100 =2702400 which ÷ 26800 = 100*l*. 16*s* 8½*d*. Lastly, 112*l* 12*s*.—100*l*. 16*s* 8½*d*.=11*l* 15*s* 3½*d*. Rebate. ans.

(5) mo. D.ct.
3=¼)5 00
1 25
100
101 25

As 101,25 : 100 :: 416 ;

D.cts.
½)832
100
101,25)41600

The present worth of 416 dols.=410. 86 4 for 3mo.

mo. D. c.
6 =½) 5 00
2 50
100
amt. 102 50

Then, as 102,50 : 100 :: 416

D. cts.
100
102,50)41600

to the pres. worth of 416d.=405 85 3 for 6mo.
add 410 86 4 for 3mo.

D. D. m.
816 71 7 pr. worth.

Lastly 832—816 71 7=15 28 3 the answer.

(6) mo. *L.* *s.* *d.* | *L.* *s.* *d.* | *L.* $\frac{1}{2}$)100

4| $\frac{1}{3}$| 5 0 0 then, as 101 13 4 : 100 :: 50

3+2 3

1 13 4 305 305)150 00

100

L. 101 13 4 Pres. worth of 50*l.* for 4mo. = *l.* 49 3 $7\frac{1}{4}$

mo. *l.* *s.* *d.* *l.* *s.* *d.* *l.* *l.*

again |4| $\frac{1}{3}$|5 0 0 then, as 103 6 8 : 100 :: 50|

1 13 4 3+1 3

3 6 8 310 310)150 00.

100

Pres. worth of 50*l.* for 8mo. *l.* 48 7 $8\frac{3}{4}$

103 6 8

Lastly 49*l* 3*s* $7\frac{1}{4}$*d.* + 48*l* 7*s* $8\frac{3}{4}$*d.* = 97*l* 11*s* 4*d.* answer.

(7) 1st. 5 × 12 = 60, & 60 + 100 = 160 the amount.

2nd, As 160dols. : 60dols. :: 500dols. : 187dols. 50ct.

Rebate. 3d. 100D. D. 500D. D.

1yr. ▷ 5 ◁ 12y. ▷ 300 Interest.

4th. 300 − 187,50 = 112,50 in favour of the Interest.

EQUATION.

EXAMPLES.

(2) 50 × 2 = 100

100 × 5 = 500

150 × 8 = 1200

3,00)18,00

answer = 6 months.

(3) 400 × 5 = 2000

400 × 10 = 4000

1,000)6,000

answer = 6 months.

(4) Suppose 20*l.* then,

20 ÷ 4 = { 5 × 2 = 10, 5 × 4 = 20, 5 × 6 = 30, 5 × 8 = 40

2,0)10,0

answer 5 mo.

(5) £. £. £.

1st. 240 − 40 = 200. Then,

Inver. as 240*l.* : 5mo. : 6mo.

5

12,00 ÷ 2,00 = 6mo. answer.

(6) £. £. £.
1st. 420—60=360, Then,
Inversely, as 420*l.* : 6mo. :: 360*l.* : 7mo.
6
252,0÷36,0=7mo. answer.

BARTER.

EXAMPLES.

lbs. *s.* lb. *s.* lbs.
(2) 1C.wt.=112 at 4*s.* per. Then, as 10 : 1 :: 448 : 44⅘
4| ½|*l.* 22 8=448*s.* answer 44lb. 12oz. 12⅘drs.

(3) 3½C.wt.=392lbs. at 5*d.* *s.* C. *d.*
5 2nd. As 28 : 1 :: 1960
12
1960*d.* C. qr. lb.
336)1960(5 3 9⅓ answer.

(4) As 20cts. : 25cts. :: 200cts.
200
2,0)500,0
Dols. 2,50 ans.

(5) As 8 6 : 10 :: 18
12 18
s. *d.*
102) 180(1 9+ans.
102
78
12
936
918
remains 18

(6) cts. cts. cts.
As 100 : 106 :: 10
10
100)1060
answer 10c 6m.

(7) C. s. *s.*
41×30=1230
l. 20×20= 400 deduct.
d. lb.
As 5 : 1 :: 830*s.*
12
5)9960
answer 1992 lbs.

(8) 320ozs.
×1,20
384,00—160=224dols. to be laid out for cotton.
Then, as 20cts. : 1lb. :: 22400cts. : 1120lb. answer.

(9) 75 sheep at 14 6
174 12
3*s.* 6*d.*=42*d.* 300 174
1275
13050*d.*
17*l.* 12*s.*= 4224 deduct.
As 42*d.* : 1bu. :: 8826 : 210bu. 4qts.
For 8826÷42=210$\frac{6}{42}$bu.=210bu. 4qts.+answer.

(10) C.
5
5
5
5
560lbs. at 6*d.*
6
3360 *d.*
Then, as 10*s.* 8*d.*=128*d.* : 1lb. :: 3360*d.* : 26lb. 4oz.
For 3360÷128=26$\frac{4}{4}$lb. or, 26lb. 4oz. answer.

(11) 63 gals.=1 hhd.
3
s. *d.* *s.* *d.*
6 8=$\frac{1}{3}$)189 gals. at 6 8
63*l.*
20
126)1260(10*s.* answer.
126
0

(12) *s.* *s.* *d.* *d.*
1st. As 12 : 13 :: 18 : 19$\frac{1}{2}$
For 18×13=234÷12=19$\frac{1}{2}$ in barter.
2nd. As 18*d.* : 1lb. :: 1200*s.* : 800lbs.
12
18)14400(800lbs. answer.
144
00

(13) *d.* *d.* *d.*
1st. As 10 : 12 :: 7½ Or,
half pen. *d.* half pen. *d.*
as 20 : 12 :: 15 : 9 in barter.

6*d.*	½	3610 at 7½*d.*
1½	¼	1805

451 3
2256 3
35*l.* × 20 = 700 0 deduct.
2nd, As 10*d.* : 1ell. 1556 3
12
1,0)1867,5
1867½ Ells answer.

(14)

			s.	*d.*
s.	1/20	20 at	21	6
d.		1		
6	½	0	10	

£. 21 10 Value of A's

£. *s.*
8 pieces at 3 14
8
From *£.* 29 12 Value of B's
Take 21 10
A receives *£.* 8 2 answer.

(15) C. qr. *£.* *s.*
5 1 at 1 18
qr. 5
1 | ¼ | 9 10
0 9 6
Val. of Tobac. *l.* 9 19 6

yds. *£.* *s.* *d.* yd.
Then, as 24 : 9 19 6 :: 1 Or, as
24yds. : 2394*d.* :: 1yd. : 99 9/24*d.* For 2394÷24=99¾*d.* or
8*s.* 3*d.*¼ answer.

(16) yds. *s.* *d.*
40 at 7 4
5 × 8 = 40
1 16 8
8
Value of the cloth *£.* 14 13 4

continued,

Then, 28½lbs. at 11 6

4×7=28

½) 2 6 0

7

16 2 0

5 9

From 16 7 9 Value of the Tea,
Take 14 13 4

A pays £. 1 14 5 answer.

(17) 7½ C.wt. =840lbs. at 8*d.*

8

Then, as 12½C. : 6720*d.* :: 1lb. Or, as 1400lbs. : 6720*d.* :: 1lb. : 4⅘*d.*+ For 6720÷1400=4⅘*d.* or 4¾*d.*+ answer.

(18) 20 C.wt. at 3*l.* Then, as 8*d.* : 1lb. :: 60*l.* Or, as

3 8*d.* : 1lb. :: 14400*d.* : 1792lbs.

L. 60 or 16C. 8lb. answer.

(19) *s.* *d.* *s.* *d.* *s.* *d.*

From 12 6 Then, as 2 6 : 10. :: 10 Or, as 30*d.* :

Take 10 0 10*s.* :: 10*d.* : 3*s.* 4*d.* answer.

s. 2 6

(20) 1st. As 2*l* 16*s.* : 3*l.* :: 5*s.* : 5*s.* 4⅘*d.*

20 20

56 60×5=300which÷56=5 5/14 or 5 4⅘

s. *s.* *d.*

2nd. 12½C.wt.×3*l.*=37*l* 10*s.* Val. of the Hops in Barter.

Gal. *s.* *d.* Gal. £. *s.* *d.*

3d. As 1 : 5 4⅘ :: 63 4th. From 37 10 0

7 Take 16 17 6

4 17 6 answer £. 20 12 6

9

£. 16 17 6

LOSS AND GAIN.

(2) 120×12=1440 & 20—17=3cts. loss on one knife.
Then say, as 1kni. : 3cts :: 1440kni. : 43,20cts. ans.

(3) 4*s* 9*d*.—4*s*.=9*d*. gain on 4 shillings.
Then, as 4*s*. : 9*d*. :: 100*l*. : 4500*d*. or 18*l*. 15*s*. ans.
(4) 1st. 17*£*.×7T.×4hhds.=476*l*. Prime cost of the wine,
2nd. 7T.×4hhds.×63gals.×8pt.=14112 pts. in 7 Tons.
3d. 1411,2÷2,0=705*l* 12*s*. and 705*l* 12*s*.—476*l*.=229*l*. 12*s* whole gain. 4th. As 476*l*. : 229*l* 12*s*. :: 100*l*. : 48*l* 4*s* 8$\frac{1}{2}$*d*.+gain per cent.
(5) 149+51=200 dols. to be given for 100 yards. Then, as 100yd. : 200dols. :: 1yd. : 2dols. answer.
(6) 60×2=120 dols. Then, as 100dols. : 4dol. :: 120 dols. : 4dol. 80ct. answer.
(7) First, 100*l*.—9*l*.=91*l*. and 500knives×15*d*.=7500*d*.
2nd. as 91*l*. : 100*l*. :: 7500*d*. : 8241$\frac{3}{4}$*d*.

	d.	×100	
3d. From	8241$\frac{3}{4}$		
Take	7500	750000÷91=8241$\frac{3}{4}$*d*.	
Remains	741$\frac{3}{4}$*d*. which÷12 and by 20=3		*£*. *s*. *d*. 3 1 9$\frac{3}{4}$ ans.

(8) First, 69*l*.×14T.=966*l*. The first cost. 14T.×20C.×4qr.×28lb.=31360lbs.
2nd. 6d. | $\frac{1}{2}$ | 31360lbs. at 6*d*.
2,0)1568,0
l. 784 sold for.
3d. From 966*l*. bought for,
Take 784 sold for.
answer. *l*. 182 loss.
(9) First 16*s*.—13*s* 4*d*.=2*s* 8*d*. gain per yard. Then, as 13*s* 4*d*. : 2*s* 8*d*. :: 100*l*. or, as 160*d*. : 32*d*. :: 100*l*. : 20*l*. For 32×100=3200 which÷160=20*l*. answer.
(10) 1C.wt.=112lb. at 11*d*. per lb.

£. *s*. *d*.	11
4 13 4=	1232
	1120*d*. subt.
	112*d*. gain.

Then, as 4*l*. 13*s* 4*d*. : 112*d*. :: 100*l*. Or, as 1120*d*. : 112*d*. :: 100*l*. : 10*l*. For 112×100=1120,0 which÷112,0=10*l*. answer.
(11) 100+15=115 yds. *£*. *s*. yd. Then, as 100 : 115 :: 56 : 64*l* 8*s*.
2nd, as 100 : 64 8 :: 1
20
1,00)12,88
answer 12$\frac{88}{100}$*s*. or, 12*s* 10$\frac{1}{2}$*d*.+

£. *£*. *£*.
56
690
575
6440÷100=64*l* 8*s*.

(12) *L. s.*
12)5 14
0 9 6*d.*

L. *L.* *s.* *d.*
Then, as 108 : 100 :: 9 6 Or, as 108*l.* : 100*l.* :: 114*d.* : 105$\frac{5}{19}$*d.*+
For 114 × 100=11400 which÷108*l.* =105$\frac{65}{1026}$*d.* or 8*s* 9$\frac{5}{19}$*d.*+ answer.

(13) *L. L. L.* *L. s. d.*
Thus, 25–18=7 then, 18*l.* 4m. > 7*l.* < 100*l.* 12m. > 116 13 4 ans.

L. m. *L.* *L.* m. *L.* *s.* *d.*
For 100×12×7÷18×4=116$\frac{2}{3}$*l.* or 116 13 4 answer.

(14) d.
2 | $\frac{1}{6}$ | 300 lbs at 4*s* 2*d.*
4
1200
+50
2,0)125,0
L. 62 10

Then, as 104*l.* : 100*l.* :: 75*l.* : 72$\frac{12}{104}$*l.* For 75×100=7500 ÷104=72*l* 2*s* 3$\frac{1}{2}$*d.* pres. worth.
And 72*l* 2*s* 3$\frac{1}{2}$*d*—62*l* 10*s.*=9*l* 12*s.* 3*d*$\frac{1}{2}$. whole gain.

5 | $\frac{1}{4}$ | 300lbs. at 5*s.*
L. 75 0
—62 10
L. 12 10

Again, As 62 10 : mo. 8 :: 12 10 : 100*l.* : 12 :: *L.* 30

500

$\frac{1}{2}$)1200
× 12$\frac{1}{2}$*l.*
14400
+ 600
5,00)150,00
L. 30 per cent.

m.
6 | $\frac{1}{2}$ | $\frac{1}{2}$ | 6*l.* per cent. for a year.
3
1
4
+100
l. 104

L. *s.* *d.*
[answer 9 12 3$\frac{1}{2}$ whole gain, and 30*l.* per ct.

(15) Thus, as 7*s.* : 110*l.* :: 8*s* 6*d.* Or, as 84*d.* : 110*l.* :: 102*d.* : 133$\frac{4}{7}$*l.* For 102×110=11220 which÷84= 133$\frac{4}{7}$*l.* or 133*l* 11*s* 5$\frac{1}{7}$*d.* Then, 133*l* 11*s* 5$\frac{1}{7}$*d.*—100*l.* =33*l* 11*s* 5$\frac{1}{7}$*d.* gained, answer.

(16) 370D.1oct.—326dols.=44D.1oct. gained on 490lbs.
Then as, 490lb. : 44D.1oct. :: 1lb. : ,09ct. answer.

(17)
£. s. d.
Thus, 6 10 0
+1 0 10

£. £. £. s.
Then, as 10,0 : 12,0 :: 7 10 10=Prime cost : 9 1 ans.
12
10)90 10 0
£. 9 1 0 answer.

(18) Thus, From 28 at 4*l.*=112*l.*

+ { 10 at 6*l.*= 60
  8 at 5*l.*= 40
Take 18 = £. 100 Value of 18 pieces.
10 pieces.
Then, as 10,0*l.* : 11,0*l.* :: 112*l.*
11
1,0)123,2
From 123 4
Take 100 0
Value of the 10 rem. pieces =*l.*23 4

Lastly, as 10pes. : 23*l* 4*s* :: 1pes. : 2*l* 6*s* 4$\frac{4}{5}$*d.*

(19) Thus, as 115*l.* : 100*l.* :: 11*s* 6*d.* Or, as 115*l.* : 100*l.* :: 138*d.* : 120*d.*=10*s.*

s. *s. d.*
From 12 &11 6 Then, as 1 6 : 15*l.* :: 2
Take 10 -10 *s. d.* *l.* *s.*
2 4 2
s. 2 1*s* 6*d.* 3 3)60 4

answer =20*l.* per cent.

(20)
Thus, as 7*s.* : 110*l.* :: 6*s.* Then, From 100 *l.* 0 *s.* 0 *d.*
6 Take 94 5 8$\frac{4}{7}$
7)660 answer *l.* 5 14 3$\frac{3}{7}$ loss.
l. 94 5 8$\frac{4}{7}$

(21) 100*l.* at $1\frac{1}{4}d.$ in the shilling.

20

$1\frac{1}{4}$ | 2000

2,0) 25,0

answer *l.* 12 10

(22)

	s.	*d.*
100 at	3	6
		10
	1 15	0
		10
answer *l.*	17 10	0

(23) $10\frac{1}{2}+2=12\frac{1}{2}$ As $12\frac{1}{2}d.$: 2*d.* :: 100*l.* Or, as 25 half pen. : 4 half pen. :: 100*l.* : 16*l.* answer.

(24) 125*l.* : 100*l.* :: 28*s.*

100

2800 ÷ 125 = $22\frac{2}{5}s.$ first cost.

Then, as $22\frac{2}{5}s.$: 112lb. :: 16*s.* : 80lbs.

5 | 112) 8960 | 80

5

lbs. 80 answer.

FELLOWSHIP.

CASE 1.

EXAMPLES.

(1)

	£.
A	1200
B	4800
C	2000
£.	8000 whole sum.

Then, as 8000 : 800 :: { 1200 : 120, 4800 : 480, 2000 : 200 } answer.

Proof 800*£.*

(2)

	T.
A	48
B	36
C	24
Tuns	108 whole stock.

Then, As 108 : 45 :: { 48 : 20 A's loss., 36 : 15 B's do., 24 : 10 C's do. } answer.

Tuns 45 Proof.

(4) £. s. d. Dols.
Thus; S. 70 0 0=16800 S's in pence.
T. 400 0 0=96000 T's do.
V. 140 12 6=33750 V's do.

409*l* 14*s*.=98328 pence. 146550=whole sum in pence.

Then, as 146550*d*. : 98328*d*. :: $\begin{cases} 16880 : 11271\frac{1}{4}+= 46\ 19\ 3\frac{3}{4}+S's \\ 96000 : 64111\frac{1}{4}+=268\ 7\ 7\frac{1}{4}+T's \\ 33750 : 22644\frac{1}{2}+= 94\ 7\ 0\frac{1}{2}+V's \end{cases}$
d. d. £. s. d.

(5) Thus; £. s. d.
A 742 12 0=178224 pence.
B 641 19 8=154076
C 987 19 9=237117

£. s. d.
1400 14 6=336174*d*. 569417=sum in pence.

Then, as d. d. :: $\begin{cases} 178224 : 105220\frac{1}{4}+A's\ share \\ 154076 : 90963\frac{3}{4}+B's\ do. \\ 237117 : 139989\frac{3}{4}+C's\ do. \end{cases}$
569417 : 336174
£. s. d.

Lastly, Pence.
105220¼÷12 & by 20=438 8 4¼+A's part.
90963¾÷12 & by 20=379 0 3¾+B's do.
1399893¼÷12 & by 20=583 5 9¾+C's do.
} answer.
£. 1400 14 6 Proof.

(6) A. R. P.
292 3 16=46856 perches.

£. £. A. R. P.
A 60 £. P. 60 : 87 3 17=A's share
B 65 then, as 200 : 46856 :: 65 : 95 0 28=B's
C 75 75 : 109 3 11=C's
} answer.
l. 200 acres 292 3 16 Proof.

(7) A. A. £.
P 90 Acres. £ 90 : 60 P. pays.
Q 120 As 360 : 240 :: 120 : 80 Q. do.
R 150 150 : 100 R. do.
} answer.
360 acres. £. 240 Proof.

CASE 2.

EXAMPLES.

(2)

	£.	mo.		
First	400 ×	9 = 3600	A's Stock and time.	
	680 ×	5 = 3400	B's do.	do.
	120 ×	12 = 1440	C's do.	do.

8440 Sum.

Then, Sum. £. As 8440 : 500 ::

Sum.	£.	s.	d.	
3600 :	213	5	4½ +	A's
3400 :	201	8	5 +	B's
1440 :	85	6	1½ +	C's
			+½	

answer.

Proof £. 500 0 0

(3)

Oxen. days.
40 × 76 = 3040
36 × 50 = 1800
50 × 90 = 4500

9340 Sum of Stock and time.

Then, Sum. £. as 9340 : 20 ::

£.	s.	d.		
3040 :	6	10	2¼	A pays.
1800 :	3	17	1	B do.
4500 :	9	12	8¾	C do.

answer.

Proof 20 0 0

(4) Thus; as 12mo. : 1800dols. :: 8 : 2700dols. Inverse.

12

21600 ÷ 8 = 2700 dols. answer.

(5)

£.	mo.	£.	mo.
First 100 ×	4 = 400	250 ×	5 = 1250
+	150	+	60
	250 × 4 = 1000		310 × 5 = 1550
−	30	+	100
	220 × 4 = 880		410 × 2 = 820

A's stock & time = 2280 B's stock & time = 3620

continued.

£. mo.
300×3= 900
−200
100×4= 400
−50
50×5= 250

2280
3620
1550
+
7450 Sum of stock & time.

C's stock & time 1550

Then, Sum. £. Sum. £. s. d.
As 7450 : 133 :: 2280 : 40 14 0¾ + A gains.
3620 : 64 12 6 + B do.
1550 : 27 13 5 + C do.
} answer.

(6)
£. mo.
First, 364×4=1456
+40
404×8=3232

£. mo.
408×7=2856
−86
322×5=1610

A's stock & time=4688
148×3= 444
+86
234×5=1170
+100
334×4=1336

B's stock & time=4466

4688
4466
+
2950
12104 sum of their Stock & time.

C's stock and time=2950

Then, Sum. £. £. s. d.
As 12104 : 1436 :: 4688 : 556 3 6½ A's gain.
4466 : 529 16 9¾ B's do.
2950 : 349 19 8 C's do.
} answer.

(7)
£.
1st. A & B= 456
B & C= 431
C & A= 375
Num. combined=2) 1262
Whole gain =£.631

£. B&C £.
Then 631—431=200 A's gain.
631—375=256 B's do.
631—456=175 C's do.

continued

To find the value of B's cloth.

A's gain. B's gain.

Say inversely, thus; { As 200 mo. 12 } > A's stock 50 < { 256 mo. 8 } > 96*l*.

For 256*l*. × 50*l*. × 12mo. ÷ 200*l*. × 8mo. = 96*l*. value of B's 160 yds. of cloth.

And 96*l*. × 20 = 1920*s*. which ÷ 160yds. = 12*s*. per yard.

Again to find the price of C's wheat per bushel.

A's gain. C's gain.

Say inversely, { As 200 mo. 12 } > A's stock 50 < { 175 mo. 7 } > 75*l*.

For 175*l*. × 50*l*. × 12mo. ÷ 200*l*. × 7mo. = 75*l*. Value of C's 240 bushels of Wheat. And 75*l*. × 20 = 1500*s*. which ÷ 240 bushels = 6¼*s*. or 6*s*. 3*d*. per bushel. answer.

EXCHANGE.

CASE 1.

EXAMPLES.

(2) 750*l*. ÷ 15 = 50*l*. and 750 + 50 = 800*l*. answer.

(3)

	l.	*s*.	*d*.
3	173	16	0
5	57	18	8
	11	11	8¼ +
answer *l*.	185	7	8¼ +

(4) 5)375

— 75

answer *l*. 300

(5)

	l.	*s*.	*d*.
	76	17	8
	200	0	0
	170	10	11
4			
	5)447	8	7
	— 89	9	8½
ans. *l*.	357	18	10½ +

6) Thus, as 90 : 56 :: 1500 : 933⅓*l*.

1500

	l.	*s*.	*d*.
8400,0 ÷ 9,0 =	933	6	8*d*. answer.

(7) 4)240
—60

£. 180 answer

(8) £. s. d.
2)562 13 8
6)281 6 10
+46 17 9½+
answer £. 328 4 7½

(9) £. s. d.
4)104 16 9
+26 4 2¼
answer l. 131 0 11¼

(10) £.
3)180
+60
answer £. 240

(11) 9)360 From
40 } +
40 }
Take 80=twice $\frac{1}{9}$
answer l. 280

(12) d. d. £.
Thus; as 56 : 90 :: 475 : $763\frac{22}{56}$l.
For 475 × 90 & ÷56=763l. 7s. 10¼d.+answer.

(13) L. s. d.
472 16 8
2
7)945 13 4
—135 1 10¾+
L. 810 11 5¼ answer.

(14) 280L.
2
7)560
80
+280
L. 360 answer.

(15) L. s. d.
96 16 9¾
2
7)193 13 7½
—27 13 4½
L. 166 0 3 answer.

(16) L. s. d.
16= { 4)36791 14 4 From
4) 9197 18 7
Take 2299 9 7¾
£. 34492 4 8¼ ans.

CASE 2.

EXAMPLES.

(3)

		£.	s.	d.
25	$\frac{1}{4}$	1470	12	8
10	$\frac{1}{10}$	367	13	2
1	$\frac{1}{10}$	147	1	3
$\frac{1}{2}$	$\frac{1}{2}$	14	14	$1\frac{1}{2}$
		7	7	$0\frac{3}{4}$
answer *L.*		2007	8	$3\frac{1}{4}$

(4) 4) £. £. £. s. d.
As 112 : 100 :: 740 14 6
28 25 5×5

3703 12 6
5
28 = (4) 18518 2 6
(7) 4629 10 $7\frac{1}{2}$
answer *L.* 661 7 $1\frac{1}{2}$

(5)

		L.	*s.*	*d.*	
L. 10 =	$\frac{1}{10}$	651	14	$11\frac{3}{4}$	at 12 per ct.
2 =	$\frac{1}{5}$	65	3	$5\frac{3}{4}$	
		13	0	$8\frac{1}{4}$	
answer *L.*		729	19	$1\frac{3}{4}$	

(6)

		L.	*s.*	*d.*	
50	$\frac{1}{2}$	452	10	6	at $77\frac{1}{2}$ per cent.
25	$\frac{1}{2}$	226	5	3	
$2\frac{1}{2}$	$\frac{1}{10}$	113	2	$7\frac{1}{2}$	
		11	6	3	
answer *L.*		803	4	$7\frac{1}{2}$	

(7)

		L.	*s.*	*d.*	
50	$\frac{1}{2}$	750	2	$4\frac{1}{2}$	at 78 per cent.
25	$\frac{1}{2}$	375	1	$2\frac{1}{4}$	
$2\frac{1}{2}$	$\frac{1}{10}$	187	10	7	
$\frac{1}{2}$	$\frac{1}{5}$	18	15	$0\frac{3}{4}$	
		3	15	0	
ans. £.		1335	4	$2\frac{1}{2}$	

(8) Thus; 167*l* 10*s*. : 100*l*. :: 1341*l* 9*s* $4\frac{3}{4}$*d*. Or, as 160800qrs. : 100*l*. :: 128781 1qrs. : $800\frac{14111}{16008}$*l*. For 128781 1 × 100 = 12878 1100 which ÷ 160800 = 800*l* 17 $6\frac{1}{2}$ ans.

(9) Thus, as 144*l*. : 100*l*. :: 260*l* 8*s* 6*d*. Or, as 34560*d*. : 100*l*. :: 62502 : $180\frac{9400}{34560}$*l*. For 62502×100=6250200 which÷34560=180*l* 17*s*. ans.

(10) *l.* *s.* *d.*

50| ½|400 17 9 at 51½ per cent.
1|1/20|200 8 10½
½| | 4 0 2½
| | 2 0 1

ans. *l.*607 6 10¼

(11) Liv. *d.* Liv. sol. den.
As 1 : 17½ : 4226 12 8 Or,
as 240*d.* : 70qrs. :: 1014392*d.* :
295864qrs. and 295864÷4 by 12
& 20=308*l* 3*s* 10*d.* currency.
Again, as 1 liv. : 10½*d.* :: 4226 liv.
12sol. 8den. Or, as 240*d.* : 42qrs. :: 1014392*d.*
: 177518qrs. or 184*l* 18*s* 3½*d.* sterling.

(12) Liv.
3|¼|49008 at 15*d.*
+12252

2,0)6126,0

l. 3063 currency.

L.
again 3063
3

4)9189

l. 2297 5 sterling, answer.

(13) *l.* *l.* Flor.
Thus, as 104 : 100 :: 4376
6 Florins=1*l.* 100

624

L. fl. sti. pen.
624)437600(701 1 13 13 answer.
4368
800
624
176
6
1056
624
432
20
8640
624
2400 &c.

(14) Thus; as 1flo. : 35¼*d.* :: 10235flo. 17stiv. 8pen.
Or, as 320pen. : 141qrs. :: 3275480pen : 1443258
qrs. For 3275480×141=461848680÷320=1443258
qrs. or 1503*l* 7*s* 10½*d* currency.
Again, as 38*s* 6*d.* : 1*l.* :: 10235flo. 17stiv. 8pen. Or, as
3696pen. : 1*l.* :: 3275480pen. : 886*l* 4*s* 5½*d.* ster. ans.

(15) pezo. *s.* *d.* pezo. rea. marv.
Thus; as 1 : 7 6 :: 2524 7 33
8 12 8
8 90 20199
34 34
272 686799×90=61811910 Then,
61811910÷272=227249½*d.*=946*l* 17*s.* 5½*d.* Penn. curr.

(16) Thus, as 6*s.* : 1dol. :: 1743*l* 16*s.*
20
34876÷6=5812⅔dols. answ.

(17)
s. *d.*
£15 d½¼ 1186 millr. 500 reas. at 7 6 per millrea.
£. *s.* *d.*
2 6½ 296 10 Then, 17)444 18 9
148 5
3 9=500 reas. ans. *£.* 26 3 5¼ per pipe
L. 444 18 9 value of 17 pipes.

(18) *s.* *d.* *L.* *G.* sti.
Thus; as 35 6 : 1 :: 2714 15
6+3 sti. 20
L. *s.* *d.*
213 213)54295(254 18 1¼+answer.

(19) Thus; as 1*l.* : 33*s* 10*d.* :: 290*l* 11*s* 10*d.* Or, as 240*d.* : 406*d.* :: 69742*d.* : 117980*d.* or 491*l* 11*s* 8*d.* Then; as 100*l.* : 117980*d.* :: 104*l* 10*s.* Or, as 2000*s.* : 117980*d.* :: 2090*s.* : 123289*d.*+ and 123289÷12 & 20=513*l* 14*s* 1*d.* answer.

(20) Thus. as 47½*d.* : 1pezo. :: 1710*l* 16*s* 4*d.* Or, as 95half pen. : 1pez. :: 821192 half pen. : 8644pezo.+ For 821192÷95=8644 pezos. answer.

(21) Thus; as 64 : 1milre. :: 1566*l* 6 8
20
31326
12
64)375920(5873millr. 750reas. ans.

(22) Thus, as 34*s.* 4*d.* : 1*l.* :: 564*l* 10*s* 6*d.*

12 — 20

412 — 11290

12

412)135486)3281 16 11¾ answer.

(23) Thus, as 4,00 reas. : 52*d.* :: 10,00 reas.

10

4)520

Then, as 34*s* 4*d.* : 1*l.* :: 130*d.* : 75¾*d.* nearly answer.

(24) 1200Cr. ÷ ½ = 600 and 600 ÷ 100 = 6Cr. the commission.

From 1200 Then as 55*d.* : 56*d.* :: 1194Cr. : 1215½+Cr.

Take 6 and 1215½+Cr. —1200Cr. = 15½+Cr.

1194 A gains. answer.

REDUCTION OF VULGAR FRACTIONS.

CASE 1.

EXAMPLES.

(2) 2)72/94 = 36/47 ans. (3) 2)84/170 = 42/85 ans. (4) 5)60/125 = 12/25 ans.

(5) 2)182/196 = 7)91/98 = 13/14 ans. (6) 9876)98768888884(9 com.meas. 9876)98768888884 = 1/9 ans.

CASE 2.

EXAMPLES.

(2) 6/10 = 3/5, 4/8 = 1/2, 1/9, 6/7,

The fractions in their lowest terms are

3/5, 1/2, 1/9, 6/7, Then,

3×2×9×7=378
1×5×9×7=315
1×5×2×7= 70
6×5×2×9=540 } numera.

5×2×9×7=630 com. deno.

Facit 378/630, 315/630, 70/630, & 540/630.

(3) 4/9, 7/11, 6/7 and 1/6,

4×11×7×2= 616
7×9×7×2= 882
6×9×11×2=1188
1×9×11×7= 693 } Numerators.

9×11×7×2=1386 com deno.

Fac. 616/1386, 882/1386, 1188/1386, & 693/1386

(4) $\frac{6}{9}=\frac{2}{3}$, $\frac{2}{7}$, $\frac{1}{3}$ and $\frac{7}{8}$
The fractions in their lowest terms
Are $\frac{2}{3}$, $\frac{2}{7}$, $\frac{1}{3}$, and $\frac{7}{8}$
Fac. $\frac{336}{504}$, $\frac{144}{504}$, $\frac{168}{504}$, & $\frac{441}{504}$

Then, $2\times7\times3\times8=336$
$2\times3\times3\times8=144$ } numerator.
$1\times3\times7\times8=168$
$7\times3\times7\times3=441$
$3\times7\times3\times8=504$ co.deno.

(5) $\frac{4}{5}$, $\frac{1}{2}$, $\frac{5}{6}$ and $\frac{2}{8}=\frac{1}{4}$
The fractions are $\frac{4}{5}$, $\frac{1}{2}$, $\frac{5}{6}$ & $\frac{1}{4}$

Then, $4\times2\times6\times4=192$
$1\times5\times6\times4=120$ } numerator.
$5\times5\times2\times4=200$
$1\times5\times2\times6=60$
$5\times2\times6\times4=240$ com. deno.

Fac. $\frac{192}{240}$, $\frac{120}{240}$, $\frac{200}{240}$ and $\frac{60}{240}$

CASE 3.

EXAMPLES.

(2) $19\times18+12=\frac{354}{18}$ ans. (3) $16\times100+18=\frac{1618}{100}$ ans.
(4) $100\times59+19=\frac{5919}{59}$ ans. (5) $514\times16+5=\frac{8229}{16}$ ans.
(6) $47\times8400+9141=\frac{397941}{8400}$ ans.

CASE 4.

EXAMPLES.

(2) $\frac{141}{17}$)141(8 $\frac{5}{17}$ Facit.
136
5
17

(3) $\frac{126}{48}$)126(2 $\frac{30}{48}$ Facit.
96
30
48

(4) $\frac{961}{17}$)961(56 $\frac{9}{17}$ Facit.
85
111
102
9
17

(5) $\frac{13}{7}$)13(1 $\frac{6}{7}$ Facit.
7
6
7

(6) $\frac{3848}{21}$)3848(185 $\frac{3}{21}$ Facit.
21
174
168
68
63
remainder 5

CASE 5.

EXAMPLES.

(2) $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4} = \frac{1 \times 2 \times 3}{2 \times 3 \times 4} = \frac{6}{24} = \frac{1}{4}$ Facit.

(3) $\frac{7}{8}$ of $\frac{4}{6}$ of $\frac{9}{10} = \frac{7 \times 4 \times 9}{8 \times 6 \times 10} = \frac{252}{480} = \frac{21}{40}$ Facit.

(4) $\frac{12}{14}$ of $\frac{5}{6}$ of $\frac{1}{2} = \frac{12 \times 5 \times 1}{14 \times 6 \times 2} = \frac{60}{168} = \frac{5}{14}$ Facit.

(5) $\frac{5}{9}$ of $\frac{4}{8}$ of $\frac{3}{4} = \frac{5 \times 4 \times 3}{9 \times 8 \times 4} = \frac{60}{288} = \frac{5}{24}$ Facit.

(6) $\frac{1}{2}$ of $\frac{8}{9}$ of $\frac{6}{7} = \frac{1 \times 8 \times 6}{2 \times 9 \times 7} = \frac{48}{126} = \frac{8}{21}$ Facit.

CASE 6.

EXAMPLES.

(2) $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{1}{12} = \frac{1 \times 1 \times 1}{2 \times 4 \times 12} = \frac{1}{96}$ s. Facit

(3) $\frac{8}{9}$ of $\frac{1}{12} = \frac{8 \times 1}{9 \times 12} = \frac{8}{108} = \frac{2}{27}$ lb. Facit.

(4) $\frac{6}{7}$ of $\frac{1}{28}$ of $\frac{1}{4} = \frac{6 \times 1 \times 1}{7 \times 28 \times 4} = \frac{6}{784} = \frac{3}{392}$ c. wt. Facit.

(5) $\frac{9}{13}$ of $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{1}{63} = \frac{9 \times 1 \times 1 \times 1}{13 \times 2 \times 4 \times 63} = \frac{9}{6552} = \frac{3}{728}$ hhd. Facit.

(6) $\frac{10}{11}$ of $\frac{1}{60}$ of $\frac{1}{24} = \frac{10 \times 1 \times 1}{11 \times 60 \times 24} = \frac{10}{15840} = \frac{1}{1584}$ day. Facit.

CASE 7.

EXAMPLES.

(2) $\frac{1 \times 12 \times 4}{96} = \frac{48}{96} = \frac{1}{2}$ qr. Facit.

(3) $\frac{2 \times 12}{27} = \frac{24}{27} = \frac{8}{9}$ oz. Facit.

(4) $\frac{3 \times 4 \times 28}{392} = \frac{336}{392} = \frac{6}{7}$ lb. Facit.

(5) $\frac{1 \times 63 \times 4 \times 2}{728} = \frac{504}{728} = \frac{9}{13}$ pt. Facit.

(6) $\frac{1 \times 24 \times 60}{1584} = \frac{1440}{1584} = \frac{10}{11}$ min. Facit.

CASE 8.

EXAMPLES.

(2) $\frac{18\times12}{43}=\frac{216}{43}=5\frac{1}{43}$ Facit.

(3) $\frac{6}{7}$ of £. 5 s. 9 / 6

7)32 14

Facit £ 4 13 $5\frac{1}{7}$

(4) $\frac{12}{16}$ of lb. = 12 oz.

12

16)144(9 oz. Facit

144

(5) $\frac{9}{11}$ of C. qr. lb. 10 1 12 / 9

11)93 0 24

Fac. c.wt. 8 1qr. 25lb. 10oz. $7\frac{3}{11}$dr.

(6) $\frac{4}{7}$ of 8 fur. = 1 mile.

4

7)32

Fur. 4 125yds. 2ft. 1in. $2\frac{1}{7}$ b.c.

(7) $\frac{4}{5}$ of $\frac{5}{1}=\frac{20}{5}$=4qrs.=1yd. Fas.

(8) $\frac{6}{7}$ of $\frac{4}{1}=\frac{24}{7}$

7)24

Facit 3qrs. $1\frac{5}{7}$ na.

(9) 5 / 4 R. P.

19)20(1 $2\frac{2}{19}$

19

1

×40

19)40(2

38

remain. 2

(10) $\frac{3}{10}$ of $\frac{24}{1}=\frac{72}{10}$)72(7 hr. min.

70

2

×60

10)120

12 min.

(11) $\frac{1}{8}$ of 7*s* 6*d*. / 12 / 8)90

Facit $11\frac{1}{4}d$.

(12) $\frac{1}{12}$ of 100*d*. / 1 / 12)100

Facit $8\frac{1}{3}d$.

(13) $\frac{2}{3}$ of 21*s*. / 2 / 9)42

Facit *s*. 4 8 ster.

$\frac{2}{3}$ of 35*s*. / 2 / 9)70

7 $9\frac{1}{3}$ Penn. curr.

(14) $\frac{4}{5}$ of £. s. 1 7 = a moidore. $\frac{4}{5}$ of £. s. 2 5 = moidore.

4 4

5)5 8 5)9 0

Facit £. 1 1 $7\frac{1}{5}$ ster. Facit £. 1 16 s. Penn. curr.

CASE 9.

EXAMPLES.

(2) $\frac{43\times5+1}{43\times12}=\frac{216}{516}=\frac{18}{43}$ s. Facit. (3) $\frac{9}{12}=\frac{3}{4}$ lb. Fac.

(4) £. s. 5 9 and £. s. d. 4 13 $5\frac{1}{7}$

20 20

109 93

12 12

1308 1121

7 7

9156 7848

Then measure 1308) $\frac{7848}{9166}=\frac{6}{7}$ Fac.

(5) C. qr. lb. oz. dr. 3 0 8 9 $13\frac{7}{13}$

4 20 C. = 1 Ton.

12 4

28 80

344 28

16 2240

5513 16

16 35840

88221 16

13 573440

1146880 13

7454720

Then com. mea. 573440) $\frac{1146880}{7454720}=\frac{2}{13}$ Facit.

(6) Ft. in. b.c. 2 8 $1\frac{1}{3}$. a yard = 3ft.

12 12

32 36

3 3

97 108

5 5

486 540

Then common measure $54)\frac{486}{540}=\frac{9}{10}$ yd. Facit.

(7) A yard $=4$qrs. / An ell Eng. $=5$qrs. Facit $\frac{4}{5}$ ell.

(8) $3\text{qrs} \times 4 + 2\text{na.} = \left.\begin{matrix} \\ 4\text{qrs.} \times 4 \end{matrix}\right\} = \frac{14}{16} = \frac{7}{8}$ yds. Facit.

(9) $1\text{R.} \times 40 + 3\text{OP.} = \frac{70}{160} = \frac{7}{16}$ acres Facit.
$4\text{R.} \times 40$

(10) $13\text{hr.} \times 60 + 30\text{min.} = \frac{810}{1440} = \frac{9}{16}$ day.
24×60

CASE. 10.

EXAMPLES.

(2) Thus; As $7 : 0 :: 42 : 48$ Facit $\frac{42}{48}$.

$$\frac{8}{336 \div 7 = 48}$$

(3) Thus; As $3 : 4 :: 34 : 45\frac{1}{3}$ Facit $\frac{64}{45\frac{1}{3}}$

$$\frac{4}{136 \div = 45\frac{1}{3}}$$

(4) Thus; As $5 : 9 :: 73 : 131\frac{2}{5}$ Facit $\frac{73}{131\frac{2}{5}}$.

$$\frac{9}{657 \div 5 = 131\frac{2}{5} \text{ denominator.}}$$

CASE 11.

EXAMPLES.

(2) Thus; As $8 : 7 :: 49 : 42\frac{7}{8}$ Facit $\frac{42\frac{7}{8}}{49}$

$$\frac{7}{343 \div 8 = 42\frac{7}{8} \text{ numerator.}}$$

(3) Thus; As $4 : 3 :: 46 : 34\frac{1}{2}$ Facit $\frac{34\frac{1}{2}}{46}$

$$\frac{3}{138 \div 4 = 34\frac{2}{4} \text{ numerator.}}$$

(4) Thus: As $9 : 5 :: 131\frac{2}{5} : 73$ Facit $\frac{73}{131\frac{2}{5}}$

$$\frac{5}{45} \qquad \frac{5}{657}$$

$$\frac{5}{3285 \div 45 = 73 \text{ numerator.}}$$

CASE 12.

EXAMPLES.

(3) Thus; $34\times2+1=23$) $\frac{69}{92}=\frac{3}{4}$ Facit.
$46\times2=$

(4) Thus; $34\times3=34$) $\frac{102}{136}=\frac{3}{4}$ Facit.
$45\times3+1=$

(5) Thus; $17\times9+4=$ $\frac{157}{387}$ Facit.
$43\times9=$

(6) Thus; $7\times5=7$) $\frac{35}{56}=\frac{5}{8}$ Facit.
$19\times5+3=$

ADDITION OF VULGAR FRACTIONS.

EXAMPLES.

(2) $3)\frac{7}{10}, \frac{11}{12}, \frac{4}{9}$ and $3\times2\times5\times2\times3=180$ least com. denom.
$2)10, 4, 3$ then, $180\div10\&\times7=126$
$180\div12\&\times11=165$ } numerators.
$180\div9\&\times4=80$ }
$5, 2, \frac{3}{2}$

com. denom. $=180)371(2\frac{11}{180}$ Facit.

(3) $\frac{1}{2}$ of $\frac{2}{3}=\frac{2}{6}=\frac{1}{3}$ Then, $19+7+\frac{1}{3}=26\frac{1}{3}$ Facit.

(4) $\frac{2}{4}$ of $\frac{7}{8}=\frac{14}{32}=\frac{7}{16}$ and $\frac{4}{8}$ of $\frac{10}{20}=\frac{76}{140}=\frac{19}{35}$
Then $7\times30=210$
$19\times16=304$
514 And $514+480=1\frac{34}{480}$, or, $1\frac{17}{240}$ Facit.
$16\times30=480$

(5) $\frac{5}{3}$ of $\frac{95}{1}=\frac{95}{3}$ Then $95\times4=380$
And $\frac{7}{8}$ of $\frac{14}{1}=\frac{98}{8}=\frac{49}{4}$ $49\times3=147$
The fractions are $\frac{95}{3}$ & $\frac{49}{4}$
$527=43\frac{11}{12}$ Facit.
$3\times4=12$

(6) $\frac{2}{3}$ and $\frac{1}{2}$
$2\times2=4$
$1\times3=3$
$7=1\frac{1}{6}$
$3\times2=6$
Then $17+1\frac{1}{6}=18\frac{1}{6}$ Facit.

(7) $\frac{1}{2}$, $\frac{2}{3}$ and $\frac{3}{4}$
$1\times3\times4=12$
$2\times2\times4=16$
$3\times2\times3=18$
$46=1\frac{11}{12}$
$2\times3\times4=24$
Then $12+3+4+1\frac{11}{12}=20\frac{11}{12}$ Facit.

(8) $\frac{7}{8}$ of $\frac{9}{10}=\frac{63}{80}$ and $\frac{4}{7}$ of $\frac{1}{2}=\frac{4}{14}=\frac{2}{7}$.
The fractions are $\frac{63}{80}$, $\frac{2}{7}$ & $\frac{1}{2}$

Then $63\times 7\times 2=882$
$2\times 80\times 2=320$
$1\times 80\times 7=560$
$1762=1\frac{642}{1120}$
$80\times 7\times 2=1120$

Then $6+7+1\frac{642}{1120}=14\frac{642}{1120}$ Facit.

(9) $\frac{4}{5}$ of $\frac{1}{3}=\frac{4}{15}$, Then the fractions are $\frac{3}{5}$, $\frac{4}{15}$ and $\frac{3}{20}$,
$3\times 15\times 20=900$
$4\times 5\times 20=400$
$3\times 5\times 15=225$
$1525=1\frac{1}{60}$
$5\times 15\times 20=1500$

Then $9+1\frac{1}{60}=10\frac{1}{60}$ Facit.

(10) $\frac{1}{9}$ £. 1 £.
20
9)20
2 2 $\frac{2}{9}$, $\frac{2}{3}$
+0 0 $\frac{3}{4}$
£. 2 3 $\frac{1}{4}$, $\frac{2}{3}$

(11) $\frac{7}{8}$ £. and $\frac{3}{4}$ s.

	s.	d.
Thus, $7\times 20\div 8=$	17	6
$3\times 12\div 4=$	0	9
Facit s.	18	3

(12) $\frac{7}{12}$ of $\frac{1}{12}=\frac{7}{144}$
the fractions are $\frac{7}{144}$lb. $\frac{1}{12}$lb.
$7\times 2=14$
$1\times 144=144$
158
$144\times 2=288$

And oz.dwt.gr.
$158\times 12\div 288=6$ 11 16 Fac.

(13) Thus, $\frac{4}{7}$T. and $\frac{9}{10}$C.

4	9
×20	×4
7)80(11C.	10)3,6
77	
3	qrs. 3–6
×4	×28
7)12(1qr.	10)16,8
7	
5	lbs. 16–8
×28	×16
7)140	10)12,8
20 lbs.	oz. 12–8
	×16
	10)12,8

(14) $\frac{3}{4}$M. and $\frac{7}{10}$ fur.$=\frac{7}{80}$M.
$3\times 80=240$
$7\times 4=28$
268
$4\times 80=320$

and $268\times 8\div 320=6\frac{224}{320}$ fur.
or, 6 fur. 28P. Facit.

continued,

(13) continued,

	C.	qr.	lb.	oz.	
	0	3	16	12	$12\frac{4}{5}$ drs.
	11	1	20	0	0
Facit	12	1	8	12	$12\frac{4}{5}$ drs.

(15) $\frac{1}{2}$ yd. and $\frac{2}{3}$ ft.

	ft.	in.
$1\times 3\div 2 = 1\frac{1}{2}$ ft. $=$	1	6
$2\times 12\div 3 =$	0	8
Facit	2	2

(16) $\frac{1}{3}$ day and $\frac{1}{2}$ hr.

	hr.	min.
Thus, $1\times 24\div 3 =$	8	0
$1\times 60\div 2 =$	0	30
Facit	8	30

(17) $\frac{1}{3}$ W. $\frac{1}{4}$ d. $\frac{1}{2}$ hr.

	d.	d. hr.
Thus, $1\times 7\div 3 = 2\frac{1}{3} =$	2	8
$1\times 24\div 4 =$	0	6
$\frac{1}{2}$ hour $=$		$0\frac{1}{2}$
Facit days	2	$14\frac{1}{2}$

(18) $\frac{2}{3}$ yd. $\frac{3}{4}$ ft. and $\frac{7}{8}$ mile.

	yd.	ft.	in.
Thus, $2\times 3\div 3 =$	0	2	0
$3\times 12\div 4 =$	0	0	9
$7\times 1760\div 8 =$	1540	0	0
Facit yds.	1540	2	9

(19)

		s.	*d.*		
$\frac{1}{7}$ £.	$1\times 20\div 7 = 2\frac{6}{7}s =$	2	$10\frac{1}{4}$,	$\frac{1}{7}$	3{21 C.D.
$\frac{2}{9}$ *s.*	$2\times 12\div 9 =$	0	$2\frac{1}{2}$,	$\frac{2}{3}$	14
$\frac{5}{12}$ *d.*	$5\times 4\div 12 =$	0	$0\frac{1}{4}$,	$\frac{2}{3}$	14
	Facit *s.*	3	$1\frac{1}{4}$,		$\frac{10}{21}$

(20) $\frac{2}{7}$ of $\frac{15}{1}$ £. $= \frac{30}{7}$ £. $3\frac{3}{7}$ £. $= 3\times 7+3 = \frac{24}{7}$ £.
$\frac{1}{3}$ of $\frac{5}{7}$ of $\frac{3}{5} = \frac{15}{105} = \frac{1}{7}$ £. $\frac{2}{3}$ of $\frac{3}{7}$ of $\frac{1}{20} = \frac{6}{420} = \frac{1}{70}$ £.
Then the fractions are $\frac{30}{7}$ £. $\frac{24}{7}$ £. $\frac{1}{7}$ £. and $\frac{1}{70}$ £. Therefore,

$30\times 7\times 7\times 70 = 102900$
$24\times 7\times 7\times 70 = 82320$
$1\times 7\times 7\times 70 = 3430$
$1\times 7\times 7\times 7 = 343$

$$\frac{188993}{7\times 7\times 7\times 70 = 24010} = 7\frac{20923}{24010}l.$$ or, £.7 17 5 0qr. $\frac{4}{7}$ qr. Fa.

(21) $\frac{2}{5}$ of $\frac{12}{1} = \frac{24}{5}$ £.
$4\frac{3}{7}l. = \frac{31}{7}$ £.
$\frac{1}{5}$ of $\frac{9}{10} = \frac{9}{50}$ £.
$\frac{3}{5}$ of $\frac{5}{6}$ of $\frac{1}{10} = \frac{1}{40}$ £.
The fractions are
$\frac{24}{5}$, $\frac{31}{7}$, $\frac{9}{50}$ and $\frac{1}{40}$ £.

Then, $24\times 7\times 50\times 40 = 336000$
$31\times 5\times 50\times 40 = 310000$
$9\times 5\times 7\times 40 = 12600$
$1\times 5\times 7\times 50 = 1750$
660350
$5\times 7\times 50\times 40 = 70000$

And $660350\div 70000 = 9\frac{30350}{70000}$ £. $= 9l.\ 8s\ 8d.$ 0qr. $-\frac{9}{35}$ qr. Fac.

(22) $\frac{3}{8}+\frac{5}{16}$
$3\times16=48$
$5\times\ 8=40$
88
$=\frac{11}{16}$ A's part.
$8\times16=128$

Then, as 16pt. : 1500*l.* :: 11parts : 1031$\frac{1}{4}$*l.*
11
16)16500(1031*l.* 5*s.* Facit.
16
5 &c.

SUBTRACTION OF VULGAR FRACTIONS.

EXAMPLES.

(2) $\frac{97}{100}-\frac{3}{7}$
$97\times7=679$
$100\times3=300$ deduct.
remains 379
$100\times7=700$ Facit.

(3) $1\times7=7$ } numer. $3\times3=9$ } rator. then, $96\frac{7}{21}-14\frac{9}{21}$
$3\times7=21$ com. deno. $81\frac{19}{21}$ Fa.

(4) Thus, from 96 take $0\frac{1}{3}$
Facit $95\frac{2}{3}$

(5) $\frac{3}{9}$ of $\frac{6}{7}=\frac{228}{9}=25\frac{1}{3}\ldots4$ (12 co. den.
$\frac{9}{12}$ of $\frac{21}{3}=\frac{189}{12}=15\frac{3}{4}\ldots9$
Facit 9_{12}^{7}

(6) $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{1}{4}=\frac{1}{4}$ then,
$\frac{409}{1100}\times\frac{1}{4}$
$\frac{436}{440}-\frac{110}{440}=\frac{326}{440}=\frac{163}{220}$ Facit.

(7) $\frac{1}{2}\bowtie\frac{17}{19}$
$\frac{19}{38}\ \ \frac{18}{38}$
Then, $71\frac{19}{38}-\frac{18}{38}=70\frac{38}{38}$ rem.

(8) $\frac{2}{3}$ of $\frac{19}{7}=\frac{38}{7}=12\frac{2}{3}$
Then, From $14\frac{1}{4}\ldots3$ (12 C.D.
$12\frac{2}{3}$ 8
remains 1_{12}^{7}

(9) $\frac{1}{2}l.=1\times20\div2=10s$ 0*d.*
$\frac{1}{4}s.=1\times12\div4=$ 0 9 –
Facit *l.* 9 3

(10) $\frac{1}{2}s.=1\times12\div2=6d.$
$-0\frac{3}{4}$
Facit *d.* $5\frac{1}{4}$

(11) $\frac{7}{8}$ of $\frac{4}{125}=\frac{7}{1000}$ oz.
$\frac{3}{5}\bowtie\frac{7}{1000}$
$\frac{480}{800}-\frac{35}{800}=\frac{445}{800}$ oz.
And $445\times20\div800=11\frac{3}{8}$dwt.
$=11$dwt. 3gr.

(12) $\frac{7}{12}$ of $\frac{1}{28}$ of $\frac{1}{4}=\frac{7}{1344}$C.
Then $\frac{1}{2}\bowtie\frac{7}{1344}$ And
$\frac{1344}{2688}-\frac{14}{2688}=\frac{1330}{2688}$ C.wt. Or,
1qr. 27lb. 6 oz. $10\frac{2}{3}$drs. Facit.

(13) $\frac{7}{10}$ of $\frac{1}{3}=\frac{7}{30}$ leagues.
Then $\frac{2}{3}\bowtie\frac{7}{10}$
$\frac{60}{90}-\frac{21}{90}=\frac{39}{90}$ leagues.
And $39\times3\div90=1$M.
2 fur. 16 perc. answer.

(14) $\frac{7}{10}$ of $\frac{1}{5}=\frac{7}{50}$ E.E.
1 E.E. = 1 yd. 1 qr. 0na.
$7\times5\times4\div50=$ —0 $2\frac{4}{5}$
Facit yd. 1 0 $1\frac{1}{5}$

(15) $7)9\frac{7}{10}d.$
$1\frac{27}{70}$ week.
& $27\times7\div70=$ 2da. 16hr. 48m.
Then from 7w. 0d. 0hr. 0min.
take 1 2 16 48
Facit w. 5 4 7 12

(16) First, $\frac{1}{2}\times\frac{1}{18}$
$\frac{18}{36}-\frac{6}{36}=\frac{12}{36}=\frac{1}{3}$
Then, from 4da. $7\frac{1}{3}$hr.
take 1 9
Facit days 2 $22\frac{1}{3}$

(17) $5\frac{3}{8}=\frac{43}{8}$£.
And $\frac{2}{7}$ of $4\frac{1}{6}=\frac{2}{7}$ of $\frac{25}{6}=\frac{50}{42}=\frac{25}{21}l.$
Then $\frac{43}{8}\times\frac{25}{21}$
$\frac{903}{168}-\frac{200}{168}=\frac{703}{168}=$ £. 4 3 $8\frac{1}{4}$ & $\frac{1}{7}$
answer.

(18) $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{3}{20}=\frac{6}{240}=\frac{1}{40}$£.
Then $\frac{5}{9}\times\frac{1}{40}$
$\frac{200-9}{360}=\frac{191}{360}$£. And
$191\times20\div360=$ 10s $7\frac{1}{4}d,\ \frac{1}{3}$
answer.

Or thus;
5
20
9)100
From s. 11 $1\frac{1}{4},\ \frac{1}{3}$
$-\frac{2}{3}$ of $\frac{3}{4}s.=$ 0 6
answer s. 10 $7\frac{1}{4},\ \frac{1}{3}$

(19) $\frac{3}{5}$ of $\frac{1}{20}=\frac{3}{100}$£. and $\frac{2}{7}$ of $5\frac{1}{6}=\frac{2}{7}$ of $\frac{31}{6}=\frac{62}{42}=\frac{31}{21}$£.
$\frac{31}{21}\times\frac{3}{100}$
$\frac{3100-63}{2100}=\frac{3037}{2100}=1\frac{937}{2100}$£. or 1l 8s $11\frac{3}{35}d.$ answer.

(20) $\frac{2}{3}$ of $\frac{5}{8}=\frac{10}{24}=\frac{5}{12}$ parts.
Then, $\frac{5}{8}\times\frac{5}{12}$
$\frac{60-40}{96}=\frac{20}{96}=\frac{5}{24}$ parts.

pts. £. pts.
Then, as 24 : 900 :: 5
5
24)4500(187l. 10s. answer.
24
210
192
180
168
$\frac{12}{24}$£. = 10s.

MULTIPLICATION OF VULGAR FRACTIONS.

EXAMPLES.

(2) $\frac{4}{8} \times \frac{7}{9} = \frac{28}{72} = \frac{7}{18}$ Facit. (3) $\frac{1}{3}$ of $\frac{4}{5} = \frac{4}{15}$ & $\frac{7}{10}$ of $\frac{11}{12} = \frac{77}{120}$ Then, $\frac{4}{15} \times \frac{77}{120} = \frac{308}{1800} = \frac{77}{450}$ Facit.

(4) $7\frac{1}{4} = \frac{29}{4}$
$8\frac{1}{2} = \frac{17}{2}$

(5) $4\frac{1}{2} = \frac{9}{2} \times \frac{1}{8} = \frac{9}{16}$ Facit.

$\frac{29}{4} \times \frac{17}{2} = \frac{493}{8} = 61\frac{5}{8}$ Facit.

(6) $13\frac{9}{10} = \frac{139}{10}$ & $\frac{7}{8} \times \frac{139}{10} = \frac{973}{80} = 12\frac{13}{80}$ Facit.

(7) $\frac{1}{2}$ of $\frac{7}{1} = \frac{7}{2}$ & $\frac{7}{2} \times \frac{3}{6} = \frac{21}{12} = 1\frac{3}{4}$ Facit.

(8) $\frac{3}{5}$ of $\frac{8}{1} = \frac{24}{5}$ & $\frac{7}{8}$ of $\frac{5}{1} = \frac{35}{8}$ Then, $\frac{24}{5} \times \frac{35}{8} = \frac{840}{40} = 21$ fa.

(9) $\frac{4}{9}$ of $\frac{11}{1} = \frac{44}{9}$ Then, $\frac{3}{6} \times \frac{44}{9} = \frac{132}{54} = 2\frac{4}{9}$ Facit.

(10) $\frac{4}{5}$ of $\frac{91}{1} = \frac{364}{5}$ & $71\frac{1}{2} = \frac{143}{2}$ then $\frac{364}{5} \times \frac{143}{2} = \frac{52052}{10} = 5205\frac{1}{5}$

(11) $12\frac{3}{5} = \frac{63}{5}$ & $\frac{1}{3}$ of $\frac{7}{1} = \frac{7}{3}$ then $\frac{63}{5} \times \frac{7}{3} = \frac{441}{15} = 29\frac{2}{5}$ Facit

(12) $7\frac{1}{2} = \frac{15}{2}$ & $9\frac{1}{4} = \frac{37}{4}$ then $\frac{15}{2} \times \frac{37}{4} = \frac{555}{8} = 69\frac{3}{8}$ Facit.

(13) $\frac{2}{9}$ of $\frac{3}{5} = \frac{6}{45}$ & $\frac{5}{8}$ of $3\frac{7}{7} = \frac{115}{56}$ then $\frac{6}{45} \times \frac{115}{56} = \frac{690}{2520} = \frac{23}{84}$ fa.

(14) Thus; $\frac{2}{7}$ of $\frac{3}{5} = \frac{6}{35}$ & $4\frac{1}{6} = \frac{25}{6}$ Then,
$\frac{5}{1} \times \frac{2}{3} \times \frac{6}{35} \times \frac{25}{6} = \frac{1500}{630} = 2\frac{8}{21}$ answer.

(15) Thus; $3\frac{1}{4} = \frac{13}{4}$ & $\frac{3}{4}$ of $\frac{3}{5} = \frac{9}{20}$ Then,
$\frac{2}{3} \times \frac{13}{4} \times \frac{5}{1} \times \frac{9}{20} = \frac{1170}{240} = 4\frac{7}{8}$ answer.

(16) Thus; $3\frac{2}{3} = \frac{11}{3}$ & $\frac{3}{5}$ of $\frac{1}{4} = \frac{9}{20}$ Then,
$\frac{11}{3} \times \frac{1}{7} \times \frac{9}{20} = \frac{99}{420} = \frac{33}{140}$ answer.

DIVISION OF VULGAR FRACTIONS.

EXAMPLES.

(2) $\frac{13}{19}\times\frac{7}{9}$
Facit $\frac{117}{133}$

(3) $\frac{14}{18}\times\frac{7}{10}$
Facit. $\frac{140}{126}=1\frac{1}{9}$

(4) $1\frac{1}{2}$ $4\frac{8}{10}$
2 10
$\frac{3}{2}\times\frac{48}{10}$
$\frac{30}{96}=\frac{5}{16}$ Facit.

(5) $\frac{7}{8}\times\frac{4}{1}$
Facit $\frac{7}{32}$

(6) $\frac{4}{1}\times\frac{7}{8}$
Facit $\frac{32}{7}=4\frac{4}{7}$

(8) $\frac{1}{2}$ of $\frac{2}{3}=\frac{1}{3}$
and $\frac{2}{3}$ of $\frac{3}{4}=\frac{1}{2}$
Then $\frac{1}{3}\times\frac{1}{2}$ Facit $\frac{2}{3}$

(7) $\frac{2}{3}$ of $\frac{3}{4}=\frac{1}{2}$ & $\frac{1}{5}$ of $\frac{19}{1}=\frac{19}{5}$, Then
$\frac{19}{5}\div\frac{1}{2}=\frac{38}{5}=7\frac{3}{5}$ Facit.

(9) $\frac{2}{3}$ of $\frac{3}{4}=\frac{7}{12}$ or, $\frac{1}{2}$& $\frac{1}{2}$ of $\frac{2}{3}=\frac{1}{3}$ Then, $\frac{1}{2}\div\frac{1}{3}=\frac{3}{2}=1\frac{1}{2}$ Fac.

(10) $4\frac{5}{9}=\frac{41}{9}$ and $\frac{5}{9}$ of $\frac{4}{1}=\frac{20}{9}$ Then, $\frac{41}{9}\div\frac{20}{9}=\frac{369}{180}=2\frac{1}{20}$ fac.

(11) $\frac{5}{9}$ of $\frac{4}{1}=\frac{20}{9}$ & $4\frac{5}{9}=\frac{41}{9}$ Then, $\frac{20}{9}\div\frac{41}{9}=\frac{180}{369}=\frac{20}{41}$ Fac.

(12) $\frac{7}{8}$ of $\frac{6}{1}=\frac{42}{8}$ and $\frac{3}{4}$ of $\frac{6}{7}$ of $\frac{11}{12}=\frac{198}{336}=\frac{33}{56}$ Then,
$\frac{42}{8}\div\frac{33}{56}=\frac{2352}{264}=8\frac{10}{11}$ Facit.

(13) $7\frac{1}{3}=\frac{22}{3}$ and $9\frac{5}{9}=\frac{86}{9}$ then, $\frac{22}{3}\div\frac{86}{9}=\frac{198}{258}=\frac{33}{43}$ answer.

(14) $\frac{2}{3}$ of $\frac{1}{3}=\frac{2}{9}$ and $\frac{5}{7}$ of $7\frac{3}{5}=\frac{5}{7}$ of $\frac{38}{5}=\frac{190}{35}=\frac{38}{7}$ Then,
$\frac{2}{9}\div\frac{38}{7}=\frac{14}{342}=\frac{7}{171}$ answer.

(15) $5205\frac{1}{5}=\frac{26026}{5}$ and $\frac{4}{5}$ of $\frac{91}{1}=\frac{364}{5}$ Then,
$\frac{26026}{5}\div\frac{364}{5}=\frac{130130}{1820}=71\frac{1}{2}$ answer.

THE SINGLE RULE OF THREE DIRECT, IN VULGAR FRACTIONS.

EXAMPLES.

(2) Thus; As $\frac{11}{13}$lb. : $\frac{7}{15}$*s.* :: $\frac{32}{43}$lb. : $\frac{2912}{7095}$*s.* For $\frac{13}{11}\times\frac{7}{15}\times\frac{32}{43}=\frac{2912}{7095}=4d.\frac{3}{4}$ $\frac{1657}{2365}$qrs. answer.

(3) Thus; As $\frac{4}{7}$E.E. : $\frac{7}{13}$£. :: $\frac{1}{1}$E.E. : $\frac{49}{52}$£. For $\frac{7}{4}\times\frac{7}{13}\times\frac{1}{1}=\frac{49}{52}$£. $=18s.$ $10\frac{2}{13}d.$ answer.

(4) $16\frac{5}{12}s.=\frac{197}{12}s.$ Then, as $\frac{2}{1}$oz. : $\frac{197}{12}s.$ :: $\frac{3}{4}$oz. : $\frac{591}{96}s.$ For $\frac{1}{2}\times\frac{197}{12}\times\frac{3}{4}=\frac{591}{96}s.=6s.$ $1d.$ $\frac{3}{4}$qr. $\frac{1}{2}$. answer.

(5) $6\frac{1}{2}=\frac{13}{2}$=the first term; $9\frac{1}{4}=\frac{37}{4}$ the third term, Then as $\frac{13}{2}$yd. : $\frac{18}{1}s.$ :: $\frac{37}{4}$yd. : $\frac{1332}{52}s.$ For $\frac{2}{13}\times\frac{18}{1}\times\frac{37}{4}=\frac{1332}{52}s.$ or $1l$ $5s$ $7\frac{1}{4}d.\frac{7}{13}$.

(6) Thus; As $\frac{1}{1}$bu. : $\frac{283}{5}d.$ :: $\frac{500}{1}$bu. : $\frac{141500}{5}d.$ For $283 \times 500 \div 5 = 28300d.$ which $\div 12$ & $20 = 117l.$ 18 4 ans.

(7) $1\frac{1}{4} = \frac{4}{4}$ & $16\frac{1}{4} = \frac{65}{4}$. Then, as $\frac{4}{4}$yd. : $\frac{9}{4}s.$ :: $\frac{65}{4}$yd. : $\frac{2340}{40}s.$ For $\frac{4}{4} \times \frac{9}{4} \times \frac{65}{4} = \frac{2340}{40}s. = 5l$ 17s. answer.

(8) $17\frac{1}{5}s. = \frac{86}{5}s.$ Then, as 1yd. : $\frac{86}{5}s.$ :: 100yd. : $\frac{8600}{5}s.$ For $86 \times 100 \div 5 = 1720s.$ which $\div 20 = 86l.$ answer.

(9) $5\frac{1}{2}s. = \frac{11}{2}$ & $16\frac{1}{15}$oz. $= \frac{241}{15}s.$ Then, as $\frac{1}{1}$oz. : $\frac{11}{2}s.$ :: $\frac{241}{15}$ oz. : $\frac{2761}{30}s.$ For $\frac{11}{2} \times \frac{241}{15} = \frac{2761}{30}s.$ And $2761 \div 30 = 92\frac{1}{30}s.$ or 4l 12s 0d. 1qr. $\frac{3}{5}$ answer.

(10) $14\frac{4}{20} = \frac{284}{20}$ & $7\frac{1}{2}$C. $= \frac{15}{2}$. Then, as $\frac{9}{10}$C. : $\frac{284}{20}l.$ :: $\frac{15}{2}$C. : $\frac{42600}{360}l.$ For $\frac{10}{9} \times \frac{284}{20} \times \frac{15}{2} = \frac{42600}{360}l. = 118l$ 6s 8d. answer.

(11) $\frac{3}{3}$ of $\frac{19}{1} = \frac{38}{3}s.$ Then, as $\frac{3}{5}$E.E. : $\frac{38}{3}s.$ :: $\frac{7}{4}$E.E. : $\frac{1330}{9}s.$ For $\frac{5}{3} \times \frac{38}{3} \times \frac{7}{4} = \frac{1330}{9} = 147\frac{7}{9}s.$ or 7l. 7s 9d. 1 qr. $\frac{1}{9}$ answer.

(12) 4s $9\frac{1}{3}d. = 57\frac{1}{3}d.$ which $\div 8$lb. $= 7\frac{1}{8}$ d. per lb. answer.

(13) $15\frac{6}{8}s. = \frac{125}{8}s.$ and $27\frac{3}{8}$yds. $\times 4 = 109\frac{1}{2} = \frac{219}{2}$yds. Then, as $\frac{1}{1}$yd. : $\frac{125}{8}s.$ :: $\frac{219}{2}$yd. : $\frac{27375}{16}s.$ & $27375 \div 16 = 1710\frac{15}{16}s.$ or 85l 10s $11\frac{1}{4}d.$ answer.

(14) 6s $0\frac{1}{2}d. = 72\frac{1}{2}d. = \frac{145}{2}d.$ and $24\frac{1}{3} \times 3\frac{1}{2} = 85\frac{1}{6}$ yds. the quantity. $85\frac{1}{6}$yds. $= \frac{511}{6}$yd. Then, as $\frac{1}{1}$yd. : $\frac{145}{2}d.$ :: $\frac{511}{6}$yd : $\frac{74095}{12}d.$ For $\frac{145}{2} \times \frac{511}{6} = \frac{74095}{12}d.$ and 74095 $\div 12 = 6174\frac{7}{12}d.$ or 25l 14s $6\frac{7}{12}d.$ $\frac{1}{3}$. answer.

(15) $\frac{1}{3} \times \frac{1}{6}$ $\frac{1}{5}$ of $\frac{2}{1} = \frac{2}{5}$lb. & 14lb. $- \frac{8}{6} = 13\frac{4}{3}$lb. $= \frac{68}{5}$lb. $\frac{6}{18} - \frac{1}{18} = \frac{3}{18} = \frac{1}{6}$lb. 1st, term; also $13\frac{4}{3}s. = \frac{66}{5}s.$ 2d. term. Then, as $\frac{1}{6}$lb. ; $\frac{66}{5}s.$ :: $\frac{68}{5}$lb. : $\frac{2602}{25}s.$ For $\frac{6}{1} \times \frac{66}{5} \times \frac{68}{5} = \frac{26025}{25}s. = 4l$ 9s $9\frac{3}{5}d.$ answer.

(16)

		120 at $8\frac{5}{8}s.$		
$\frac{4}{8}$	$\frac{1}{4}$	12 0 at 2s.		
		4		
		48 0		
$\frac{1}{8}$	$\frac{1}{4}$	3 0		
		0 15		

£. 51 15 Prime cost.

£.	s.	
From 70	0	sold for
Take 51	15	bought for
£. 18	5	whole gain.

Then, as 51l 15s. : 18l 5s. :: 100l. : 35l 5s $3\frac{3}{4}d.$ $\frac{5}{6}$ answer.

(17) $17\frac{5}{8}l.=\frac{141}{8}l.$ & $13\frac{2}{3}$lb. $=\frac{41}{3}$ lb. Then, as $\frac{112}{1}$ lb. : $\frac{141}{8}l.$ :: $\frac{41}{3}$lb. : $\frac{5781}{2688}l.$ For $\frac{1}{112}\times\frac{141}{8}\times\frac{41}{3}=\frac{5781}{2688}=2\frac{405}{2688}l.$ or 2*l* 3*s*. $\frac{3}{224}$ answer.

(18) $\frac{1s.\times12+3=15}{1l.\times20\times12=240}=\frac{1}{16}£.$ and $73\frac{1}{16}l.=\frac{1169}{16}l.$ and 250*l* 10*s* $=250\frac{1}{2}l=\frac{501}{2}£.$ Then, as $\frac{1169}{16}l.$: $\frac{1}{8}$pt. :: $\frac{501}{2}l.$: $\frac{8016}{18704}$pt. For $\frac{16}{1169}\times\frac{1}{8}\times\frac{501}{2}=\frac{8016}{18704}=\frac{3}{7}$. answer.

(19) mul. $3\frac{1}{2}$ and $1\frac{1}{2}$ by $3\frac{1}{2}$ by $1\frac{1}{2}$

$10\frac{1}{2}$ $\frac{1}{2})1\frac{1}{2}$

$3\frac{1}{2}\div\frac{1}{2}=1\frac{3}{4}$ $0\frac{3}{4}$

$12\frac{1}{4}$lb. $2\frac{1}{4}$lb.

$12\frac{1}{4}$lb. $=\frac{49}{4}$lb. and $2\frac{1}{4}l.=\frac{9}{4}l.$

$\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{49}{4}=\frac{49}{24}$lb.

Then, as $\frac{49}{4}$lb. : $\frac{9}{4}$lb. : $\frac{49}{24}$lb. : $\frac{1764}{4704}l.$ For $\frac{4}{49}\times\frac{9}{4}\times\frac{49}{24}=\frac{1764}{4704}£.$ and $1764\times20s\div4704=7\frac{1}{2}s.$ or 7*s* 6*d.* answer.

(20) $22\frac{3}{8}\times4\frac{3}{4}$ $8\frac{3}{4}s.=\frac{35}{4}s.$ second term.

8 4

$\frac{179}{8}\times\frac{19}{4}=\frac{3401}{32}$yds. Then, as $\frac{1}{1}$yd. : $\frac{35}{4}s.$ :: $\frac{3401}{32}$ yd. :: $\frac{119034}{128}s.$ For $\frac{35}{4}\times\frac{3401}{32}=\frac{119035}{128}=929\frac{123}{128}s.=46£.$ 9*s* 11*d.* 2qrs. $\frac{1}{8}$. answer.

(21) $\frac{2}{3}$ of $\frac{4}{5}=\frac{8}{15}$ Then, as 8 parts : 319£. :: 15 parts : 598*l* 2*s* 6*d.* answer.

THE SINGLE RULE OF THREE INVERSE, IN VULGAR FRACTIONS.

EXAMPLES.

(2) $1\frac{1}{5}$yd. $=\frac{6}{5}$ & $3\frac{1}{4}$yd. $=\frac{13}{4}$ Then, as $\frac{6}{5}$yd. : $\frac{13}{4}$yd. :: inverted. $\frac{4}{5}$yd. : $4\frac{7}{8}$yds. For $\frac{6}{5}\times\frac{13}{4}\times\frac{5}{4}=\frac{390}{80}=4\frac{7}{8}$yds. $=$4yds. 3 qrs. 2na. answer.

(3) $28\frac{1}{3}$da. $=\frac{85}{3}$days. Then, as $\frac{16}{1}$m. : $\frac{85}{3}$da. :: $\frac{12}{1}$m. : inverted. $\frac{1360}{36}$days. For $\frac{16}{1}\times\frac{85}{3}\times\frac{1}{12}=\frac{1360}{36}$days. (i.e.) $1360\div36=37\frac{7}{9}$ days. answer.

(4) $20\frac{1}{2}$yds. $=\frac{41}{2}$ & $1\frac{1}{4}$yd. $=\frac{5}{4}$. Then, as $\frac{5}{4}$yd. : $\frac{41}{2}$yd. ::
inverted.
$\frac{3}{4}$yd. : $\frac{820}{24}$yds. For $\frac{5}{4}\times\frac{41}{2}\times\frac{4}{3}=\frac{820}{24}$yds. $820\div24=$ $34\frac{1}{6}$yds. answer.

(5) As 3 : $4\frac{1}{2}$ :: 10 : $1\frac{7}{20}$hr. For $4\frac{1}{2}\times3\div10=1\frac{7}{20}$hr. or 1hr. 21 min. answer.

(6) $5\frac{1}{2}$*s.* $=\frac{11}{2}$ & $2\frac{1}{2}$oz. $=\frac{5}{2}$oz. Then, as $\frac{7}{1}$oz. : $\frac{11}{2}$*s.* :: $\frac{5}{2}$oz. : $15\frac{4}{10}$*s.* inverted.
For $\frac{7}{1}\times\frac{11}{2}\times\frac{2}{5}=\frac{154}{10}=15\frac{4}{10}$*s.* $=15$*s* 4*d.* 3qrs. $\frac{1}{5}$ answer.

(7) $6\frac{1}{4}$*s.* $=\frac{25}{4}$*s.* $4\frac{1}{2}$*s.* $=\frac{9}{2}$*s.* Then, as $\frac{25}{4}$*s.* : $\frac{9}{1}$oz. :: $\frac{9}{2}$*s.* :
inverted.
$\frac{450}{36}$oz. $=12\frac{1}{2}$oz. For $\frac{25}{4}\times\frac{9}{1}\times\frac{2}{9}=\frac{450}{36}$oz. and $450\div36=$ $12\frac{1}{2}$oz. $=12$ oz. 8dr. answer.

(8) $3\times4=12$ Then as 3qr. : 12yd. :: 4qr. : 9yds. ans.

(9) $1\frac{1}{4}$yd. $=\frac{5}{4}$yd. Thus, as $\frac{5}{4}$yd. : $\frac{275}{1}$yd. :: $\frac{3}{4}$yd. : $\frac{5500}{12}$
inverted.
yds. For $\frac{5}{4}\times\frac{275}{1}\times\frac{4}{3}=\frac{5500}{12}$yds. and $5500\div12=458\frac{1}{3}$ yds. answer.

(10) An Ell Eng. $=\frac{5}{4}$yd. Then, as $\frac{3}{4}$yd. : $\frac{20}{1}$yd. :: $\frac{5}{4}$yd.
inverted.
: $\frac{240}{20}=12$ yds. For $\frac{3}{4}\times\frac{20}{1}\times\frac{4}{5}=\frac{240}{20}=12$yds. answer.

(11) $5\frac{8}{9}$C. $=\frac{53}{9}$ of $\frac{4}{1}$ of $\frac{28}{1}=\frac{5936}{9}$lb. $6\frac{3}{4}$*d.* $=\frac{27}{4}$*d.* and $8\frac{5}{8}$*s.* $=\frac{69}{8}$ of $\frac{12}{1}=\frac{828}{8}$*d.* Then, as $\frac{27}{4}$: $\frac{5936}{9}$ :: $\frac{828}{8}$: $43\frac{1}{69}$
inverted.
lb. For $\frac{27}{4}\times\frac{5936}{9}\times\frac{8}{828}=\frac{1282176}{29808}=43\frac{1}{69}$lb. answer.

(12) $12\frac{1}{2}$*s.* $=\frac{25}{2}$*s.* $240\frac{1}{7}$ pieces $=\frac{1681}{7}$, and $20\frac{1}{8}$*s.* $=\frac{161}{8}$*s.* Then, as $\frac{25}{2}$*s.* : $\frac{1681}{7}$pcs. :: $\frac{161}{8}$*s.* : $\frac{336200}{2254}$pieces.
inverted.
For $\frac{25}{2}\times\frac{1681}{7}\times\frac{8}{161}=\frac{336200}{2254}=149\frac{177}{1127}$pieces answer.

(13) $100\frac{2}{3}l=\frac{302}{3}l.$; $6\frac{2}{3}$ mo. $=\frac{20}{3}$ mo. and $3\frac{5}{6}=\frac{23}{6}$ of $\frac{12}{1}=$ $\frac{276}{6}=\frac{46}{1}$mo. Then, as $\frac{20}{3}$mo. : $\frac{302}{3}$£. :: $\frac{46}{1}$mo. : $\frac{6040}{414}$
inverted.
$=14\frac{244}{414}$£. For $\frac{20}{3}\times\frac{302}{3}\times\frac{1}{46}=\frac{6040}{414}$£. $=14$*l* 11*s* 9*d.* 1qr. $\frac{5}{69}$ answer.

(14) $5\frac{7}{12}=\frac{67}{12}$*s.* $26\frac{5}{8}=\frac{213}{8}$yds. and $8\frac{1}{2}=\frac{17}{2}$*s.* Then, as $\frac{67}{12}$*s.* : $\frac{213}{8}$ yds. :: $\frac{17}{2}$*s.* $=\frac{28542}{1632}$ yds. For $\frac{67}{12}\times\frac{213}{8}\times$
inverted.
$\frac{2}{17}=\frac{28542}{1632}=17$yds. 2qrs. 3na. $\frac{14}{17}$. answer.

THE DOUBLE RULE OF THREE IN VULGAR FRACTIONS.

EXAMPLES.

(2) Stated thus; stud. 9, days 18 > $10\frac{7}{9}l.$ < 20 students, 30 days > $39\frac{1338}{1458}$£.

$$\begin{array}{ccc} 162 & \frac{97}{9} & 600 \end{array}$$

For $600 \times 97 \div 162 \times 9 = 39\frac{1338}{1458}$£. $= 39l\ 18s\ 4\frac{20}{81}d.$ answer.

(3) Thus; m. 3, d. $19\frac{1}{2}$ > $8\frac{9}{10}l.$ < 20 mon., $100\frac{1}{4}$ days > $305\frac{16}{468}$£.

$19\frac{1}{2}$days$\times$3m.$=\frac{117}{2}$; $8\frac{8}{10}l.=\frac{89}{10}l.$ and $100\frac{1}{4}$days $\times$20m.$=\frac{8020}{4}$. Then, inverted, $\frac{2}{117}\times\frac{89}{10}\times\frac{8020}{4}=\frac{1427560}{4680}$£.$=$ $305l$ or $8\frac{8}{13}d.$ answer.

(4) Thus; P. 5, w. 1 > $7\frac{4}{5}$ G. < 8 Pers., $22\frac{1}{2}$ w. > $280\frac{20}{25}$ gal.

$7\frac{4}{5}$ gal.$=\frac{39}{5}$gal. and $22\frac{1}{2}$w.$\times$8per.$=$180 third term. 1st. term inver.

Then, $\frac{180}{1}\times\frac{39}{5}\times\frac{1}{5}=\frac{7020}{25}=280\frac{4}{5}$ gal. answer.

(5) Thus, 14 pers. > weeks < 46pers. > $3\frac{56}{1173}$ weeks. Inversely; $40\frac{4}{5}$ £. 20 $20\frac{3}{7}$£.

$40\frac{4}{5}=\frac{204}{5}\times46=\frac{9384}{5}$ and $20\frac{3}{7}=\frac{143}{7}\times14=\frac{2002}{7}$. Then $\frac{5}{9384}\times\frac{20}{1}\times\frac{2002}{7}=\frac{200200}{65688}=3\frac{56}{1173}$ weeks answer.

(6) First, $13\frac{1}{3}=\frac{40}{3}$£. and $1\frac{1}{12}=\frac{13}{12}$£. interest.

Thus; as $\left\{\frac{40}{3}\text{£.}, \frac{3}{4}\text{yr.}\right.$ > $\frac{13}{12}$£. < $\frac{50}{1}$£., $\frac{5}{12}$yr. > $2\frac{37}{144}$£.

Secondly, $\frac{40}{3}\times\frac{3}{4}=\frac{120}{12}=\frac{10}{1}$ and $\frac{50}{1}\times\frac{5}{12}=\frac{250}{12}$. Then, as inverted $\frac{10}{1}$: $\frac{13}{12}$ :: $\frac{250}{12}$: $\frac{3250}{1440}$£. For $\frac{1}{10}\times\frac{13}{12}=\frac{250}{12}\times\frac{3250}{1440}=2\frac{37}{144}$£. or $2l\ 5s\ 1d.$ 2qr.$\frac{2}{3}$ the Interest.

To find the rate per cent. $\frac{50}{1}\times\frac{5}{12}=\frac{250}{12}$ and $\frac{100}{1}\times\frac{12}{12}=\frac{1200}{12}$. Then, as $\frac{250}{12}$: $\frac{3250}{1440}$£. :: $\frac{1200}{12}$: $10\frac{5}{6}$£. For $\frac{12}{250}\times\frac{3250}{1440}\times\frac{1200}{12}=10\frac{5}{6}$£. answer.

(7) $2l\ 5s\ 1d.$ 2qr.$\frac{2}{3}=\frac{3250}{1440}$£. $13\frac{1}{3}=\frac{40}{3}$£. and $1\frac{1}{12}=\frac{13}{12}$£.

Thus, by 2 statings.

1st. inversely, as $\frac{50}{1}$: $\frac{5}{12}$ :: $\frac{40}{3}$: $\frac{750}{480}$ year. For $\frac{50}{1}\times\frac{5}{12}\times\frac{3}{40}=\frac{750}{480}$; 2nd. as $\frac{3250}{1440}$: $\frac{750}{480}$ :: $\frac{13}{12}$: $\frac{14040000}{18720000}$ year. For $\frac{1440}{3250}\times\frac{750}{480}\times\frac{13}{12}=\frac{14040000}{18720000}=\frac{3}{4}$ year the time.

Now to find the Rate. $\frac{40}{3}\times\frac{3}{4}=\frac{120}{12}=\frac{10}{1}$ and $\frac{100}{1}\times\frac{12}{12}=\frac{1200}{12}=\frac{100}{1}$ Then, as $\frac{10}{1}:\frac{1\frac{1}{2}}{1}::\frac{100}{1}:\frac{1200}{120}$£. For $\frac{1}{10}\times\frac{1\frac{1}{2}}{1}\times\frac{100}{1}=\frac{1300}{120}=10\frac{5}{6}$£. answer.

(8) Thus; as 12 : $1\frac{1}{8}$ :: 8 : $\frac{3}{4}$

4)m. lb. 4 m. lb.

12 — 2 — 8

3 — 2

3)$2\frac{2}{8}$

$0\frac{16}{24}=\frac{2}{3}$lb.

mo. lb. mo.

Then, as 1 : $\frac{3}{4}$ :: 6 : $4\frac{1}{2}$lb.

6

$18\div4=4\frac{1}{2}$lb. answer.

(9) $56\frac{1}{4}=\frac{225}{4}$£. and $5\frac{1}{3}=\frac{16}{3}$ year.

Then, as $\frac{1}{4}$yr. : $\frac{225}{4}$£. :: $\frac{16}{3}$yr. $\frac{1400}{36}$£.$=400$£. for 2 Sons. For $\frac{4}{1}\times\frac{225}{4}\times\frac{16}{3}=\frac{1400}{36}=400$£. and $400\times3\div2=600$£. answer.

DECIMAL FRACTIONS.

ADDITION.

EXAMPLES.

(2) £. 857,7383

(3) 450,
31,47
376,004
1,08
456,
,76
,05

answer 1315,364

(4) 2476,8478
94,9
9,8941
867,05
84,9
271,007
5,1008
1,6789

answer 3811,3779

SUBTRACTION OF DECIMALS.

EXAMPLES.

1636,368 Gallons. 14894,399 Miles. 808,5581 Acres.

841,46
109,62
34,691

(1) From 100,17 From 985,771
Take 84,476

478,462
37,66
378,8

answer 15,694 Take 894,922

answer 90,849

MULTIPLICATION OF DECIMALS.

EXAMPLES.

(2) mul. 79,347
by 23,15

396735
79347
238041
158694

Facit 1836,88305

(3) mul. ,63478
by ,8264

253912
380868
126956
507824

Facit ,524582192

(4) mul. 3,141592
by 52,7438

25132736
9424776
12566368
21991144
6283184
15707960

Facit 165,699500 1296

(5) mul. ,385746
by ,00463

1157238
2314476
1542984

Facit ,00178600398

(6) Mul. .002534
.03256

15204
12670
5068
7602

Facit 00008250704

(7) Thus; 245.378 263
5834 27

171764784
4907565
981513
73614
19630
1227

Facit 17774.6333

(8) Thus; 674.4378
863.72

134888
47210
2023
405
54

Facit 18458,0

(9) Thus; 27.1498600
53014.29

2443487400
54299720
10859944
271499
8145
1357

Facit 2508,928065

(10) Thus; 184.82 07
594 75.31

184 82 07
55 44 62
9 24 10
1 29 38
7 39
1 66
6

Facit 2508.928

DIVISION OF DECIMALS.

EXAMPLES.

(2) 23,15)1836,88305(79,347 Facit.

1620 5
216 38
208 35
8 033
6 945
1 0880
9260
16205
16205

(3) 158,694)3673,7661(23,15 fac.

3173 88
499 886
476 082
23 8041
15 8694
793470
793470

(4) 64,25)234,70525(3,653 Facit.

192 75
41955
38550
34052
32125
19275
19275

(5) ,9)9,0

Facit 10

(6) 9),9

Facit ,1

(7) 3),3

Facit ,1

(8) ,00463),0017860039 8(,385746 Facit.

1389
3970
3704
2660
2315
3453
3241
2129
1852
2778
2778

(9) 92,41035)2508,928065051(27,1498 Facit.
18482970
6607210
6468725
138485
92410
46075
36964
9111
8317
794
739
55

(10) 771492)00357200796(,00463 Facit.
3085968
4860399
4628952
2314476
2314476

(11) 9,3654070)87,0763260(9,2976552
842886630
27876630
18730814
9145816
8428866
716950
655578
61372
56192
5180
4683
497
468
29
19
19
0

(12) 18,730814)174,152652(9,297 Facit.
168577
5575
3746
1829
1686
143
131
12

REDUCTION OF DECIMALS.

CASE I.

EXAMPLES.

(2) $\frac{1}{2}$)1,0
Facit ,5

(3) $\frac{3}{4}$)3,00
Facit ,75

(4) $\frac{5}{26}$)5,0000(,1923+facit.
26
240
234
60
52
80
78
2

(5) $\frac{26}{57}$)26,00000),45614+Facit.
228
320
285
350
342
80 &c.

(6) $\frac{11}{14}$ of $\frac{10}{13}=\frac{110}{182}$
Then, 182,110,0000000(,6043956+Facit.
1092
0800
728
720
546
1740 &c.

(7) $4)^{12}\frac{2}{6}=\frac{3}{4}$ of $\frac{5}{13}$ of $\frac{7}{26}=\frac{105}{1352}$
Then, 1352)105,00000(,07766+Facit.
9464
10360
9464
8960
8112
8480
8112
368

(8) $\frac{3}{8}$)3,000
Facit ,375

(9) $2\frac{1}{25}$)1,0
Facit ,04

(10) $\frac{11}{80}$)11,00 Facit ,55 | $\frac{57}{60}$)57,00 Fac. ,95 | $\frac{375}{1000}=\frac{3}{8}$)3,000 Facit ,375 | $\frac{7}{8}$)7,000 Fac. 875

$2\frac{14}{256}=14,0000000\div256=,0546875$. Facit.

CASE 2.

(2) 12|6,0 *d.*
20|7,500*s.*
Facit ,375£.

(3) 12|9,00*d.*
20|,7500*s.*
Facit ,0375£.

(4) 4|1,00 qrs.
12|9,2500000 *d*
20|10,7708333*s.*
Facit ,53854166.

(5) 1lb.×12×20×24=5760 grains in 1lb.
Then 24,00000000÷5760=,0041666+Facit.

(6) 16oz.×16dr.=256dr.=1lb.
dr.
Then, 256)14,00000(,0546875 Fac.
1280
1200
1024
1760 &c.

(7) a Ton=20 C. 4 C. qr. 2
4 4
qrs. 80 18,000
Facit ,225 T.

8 Fur. P. yds.
A mile=8×40×5½yds=1760yds.
Then, 76,000000yds.÷1760=
,04318+Facit.

(9) A yard = 4 qrs. 3 na. 2

4 | 4

na. 16 | 14,000 (,875 yd.
128
12 &c.

(10) An acre = 160 perches.

160) 4,0000 (,025 acre.
320
800
800

(11) 1 gal. = 8pts.) 1,000
Facit .125 gal.

(12) 1day = 24hr. × 60min. = 1440min.
Then, 7,00000min. ÷ 1440 =,00480 + day. Facit.

(13) 28 | 14 olbs.

4 | 2,500qrs.

Facit 3,625C.wt.

(14) 4 | 3,00na.

4 | 2,7500qrs.

Facit 7,6875yds.

(15) 40 | 14,00 poles.

4 | 1,3500 R.

Facit 13,3375 acres.

(16) 7 | 5,000000 days.

4 | 1,714285 + weeks.

Facit 3,428571 + months.

CASE 3.

(2) ,76*l.*
20
s. 15,20
12
d. 2,40
4
qr. 1,60

(3) ,625*s.*
12
d. 7,500
4
qrs. 2,000

(4) ,8322916*l.*
20
s. 16,6458320
12
d. 7,7499840
4
qrs. 2,9999360

(5) ,861 Cwt.
4
qrs. 3,444
28
lbs. 12,432
16
oz. 6,912
16
dr. 14,592

(6) ,7 lb. Troy
12
oz. 8,4
20
dwt. 8,0

(7) ,761 day.
24
hrs. 18,264
60
min. 15,840
60
sec. 50,400

(8) 4oz.=$\frac{1}{3}$),71 of 4oz Troy.

,236666+lb.
12+7

oz. 2,839999
20

dwt. 16,799980
24

grs. 19,1999520

(9) ,67 of a League.

3
m.2,01
8
fur. 08
40
P. 3.20
$5\frac{1}{2}$
100
+ 10
qr. 1,10
3
ft. ,30
12
in. 3,60
3
b.c. 1,80

(10) ,4712 of an E. Eng.

5
qrs. 2,3560
4
na. 1,4240

(11) 3A. 2R. 4|2,0R.

3,5 acre.
×,092
70
315
,3220 acre.
4
R. 1,2880×40
P. 11.5200

(12) A year=365,25days.

,3
days 109,575
24
2300
1150
hr. 13,800
60
min. 48,000

(13) ,6875yds.×4=2,7500qrs.×4=3,00 na. answer.

(14) ,3375 Acre.

4
R. 1,3500
40
P. 14,0000

(15) Thus; ,785£.

s. 15 $8\frac{1}{2}$

For 7+7+1=15s. 0d.
and 35—1=34qrs.= $8\frac{1}{2}$

answer s. 15 $8\frac{1}{2}$

(16) Thus; ,875 of a £.

17 6

For 8+8+1=17s.
and 25—1=24qr.=6d.
answer s. 17 6

(17) mul. 12,4
by 9

answer £. 111,6=111l 12

(18) 25yds. at 2,75

25

1375
550

£.68,75
20

s. 15,00

(19) ,48 of a lb.

20

9,60
+ ,16 of a *s.*

s. 9,76
12

d. 9,12

(20) ,17 of a lb. troy

12

2,04
+ ,84 of an oz.

oz. 2,88
20

dwt. 17,60
24

gr. 14,40

(21) ,17 of a T.

20

3,40
+ ,19C.wt.

C.wt. 3,59
4

2,36
+ ,17qrs.

qrs. 2,53
28

14,84
+ ,7 of a lb.

lb. 15,54

(22) ,78 Acre.

4

3,12
+ ,67R.

R. 3,79
40

P. 31,60

(23) ,17 of a £.

20

3,40
— ,7 of a *s.*

s. 2,70
12

d. 8,40
4

qr. 1,60

(24) ,41 of a day.

24

164
82

9,84
—,16 of an hr.

hr. 9,68

then, hr. 9,68
60

min. 40,80
60

sec. 48,00

THE SINGLE RULE OF THREE IN DECIMALS.

DIRECT PROPORTION.

EXAMPLES.

(2) Thus; as 1,6C. : 3*l* 12,76*s*. :: 11C. 3qr. 10,12lbs. × 3, Or, as 179,2lbs. : 3,638£. :: 3978,36lbs. : 80,76 6036£. For 3978,36 × 3,638 ÷ 179,2 = 80£ 15*s* 3*d*. ½, 36qrs. answer.

(3) Thus; as 1,5oz. : 7,8*s* :: 9,7lb. Or, as 1,5oz. : 7,8*s*. :: 116,4oz. : 605,28*s*. For 116,4 × 7,8=907,92 which ÷1,5=30*l* 5*s* 3*d*. 1,44qr. answer.

(4) Thus; as 1,47C. : 4,5*l*. :: 1,7lb. Or, as 164,64lbs. : 1080*d*. :: 1,7lb. : 11,1+*d*. For 1080×1,7=1836,0 which÷164,64=11,1+*d*. answer.

(5) Thus; as 1pt. : 1,2*s*. :: 12,5hhds. Or, as 1pt. : 1,2*s*. :: 6300pts. : 378*l*. For 6300×1,2=7560*s*. which ÷20=378*l*. answer.

(6) Thus; as 1yd. : 12,3*s*. :: 21,5yds.×3 Or, as 1yd. : 12,3 :: 64,5 : 793,35*s*. For 64,5×12,3=793,35*s*. which÷20=39*l* 13*s* 4,2*d*. answer.

(7) Thus: as 8,4lb. : 16*s* 4,6*d*. :: 4C. 2qr. 7,4lb. × 3. Or, as 8,4lb. : 196,6*d*. :: 1534,2lbs. : 35907,466*d*.+ For 1534,2×196,6÷8,4=149*l* 12*s* 3½*d*. nearly. ans.

(8) Thus; as 4*s* 2,6*d*. : 1yd. :: 6*l* 13,12*s*. Or, as 50,6*d*. : 1yd. :: 1597,44*d*. : 31,569yds. For 1597,44÷50,6 =31,569+yds. answer.

(9) 5,8T.×4×63=1461,6gal. and 60,4*l*.×20×12=14496 *d*. Then, as 1461,6gal.—50,9gal. : 14496 :: 1gal. : 10,27*d*.+ For 14496÷1410,7=10,27 pence. answer.

(10) 7,6C. × 4qr. × 28 lb. = 851,2lbs. Then, as 1lb. : 4,5*d*. :: 851,2lbs. : 3830,4*d*. For 851,2×4,5=3330, 4*d*.=319,2*s*. sold for. And, as 1C. : 40,1*s*. :: 7,6C. : 304,76*s*. bought for. Then, 319,2*s*.—304,76*s*.=14, 44*s*.=14*s* 5*d*. 1.12qr. answer.

(11) 3C. 1,5qr.=378lb. Then, as 1lb. : 2,75*s*. :: 378lb. : 51*l* 19*s* 6*d*. And 60*l* 11*s* 6*d*.—51*l* 19*s* 6*d*.=8*l* 12*s*. gain answer.

(12) From 10,75*s*.—8,5*s*.=2,25*s*. Then, as 1yd. : 2,25*s*. :: 436yds : 981*s*. or 49*l* 1*s*. answer.

(13) Thus; as 1*l*. : 7,5*s*. :: 296,85*l*. : 2226,375*s*.=111*l* 6*s* 4*d*½*d*. answer.

(14) First 7*s* 9½*d*.=93,5*d*. and 25*l* 18*s* 1¾*d*.=6217,75*d*. Then, as 93,5*d*. : 4qrs. : 6217,75*d*. : 266qrs. which ÷5=53E.E. 1qr. answer.

(15) Thus; as 1yd. : 4,5ct. :: 345yds. : 1552,5cents, or 15D. 52ct. 5m. answer.

(16) Thus; as, 12825m : 675yds. :: 38m. : 2yds. ans.

(17) Thus; as, 19yds. : 25,75D. :: 435,5yd. : 590,217D.+ For 435,5×25,75÷19=590D. 2d. 1ct. 7$\frac{7}{19}$m. ans.

(18) $7\frac{3}{8}$yds.=7,375yds. and $5\frac{1}{2}$ dol.=5,5dols. Then, as 1yd. : 5,5dols. :: 7,375 yds. : 40,5625 dols.=40dols. $56\frac{1}{4}$ct. answer.

(19) Thus; as 7,375yds. : 40,5625dol. :: 1yd. : 5,5dol. For 40,5625÷7,375=5,5dols. answer

(20) Thus; as 1,068ft. : 1 ft. :: 6ft. : 5,618ft.

$$1{,}068\overline{)6{,}0000000}(5{,}618\text{ft. nearly. ans.}$$

5340
6600
6408
1920
1068
8520
8544

INVERSE PROPORTION.

EXAMPLES.

(2) Thus; as 6*l.* : 1,1333oz. :: 1,8125 : 3,75 oz. nearly. For 1,1333×6=6,7998 which÷1,8125=3oz. 12dr. ans.

(3) Thus; as 1ft. : 12ft. :: ,75ft. : 16ft. For 12,00÷,75 =16 feet. answer.

(4) Thus; as 1,25yd. : 25,5 yds. :: ,75 yds. : 42,5 yds. For 25,5×1,25÷,75=42,5yds. answer.

(5) Thus; as 1E. : 4,5*s.* :: 25,6E. : 115,2*s* value of B's Holland. Then 115,2÷40,7=2,8304*s.*=2*s* 9*d.* 3,8qrs. per yd. answer.

(6) 34,5×100=3450*s.* As 7,5*s.* : 1D. :: 3450*s.* : 460D. For 3450÷7,5=460 dollars, answer.

(7) Thus; as 15mo. : 450*l.* :: 7,5mo. : 900*l.* For 450 ×15÷7,5=900*l.* answer.

THE DOUBLE RULE OF THREE IN DECIMALS.

EXAMPLES.

(2) Thus; as $\left\{\begin{matrix}2\text{men}\\1\text{day}\end{matrix}\right\}$: 4,625*s.* :: $\left\{\begin{matrix}4\text{ men}\\10,5\text{ days}\end{matrix}\right\}$: 97,125*s.* For 4,625×4×10,5÷2=4*l* 17*s* 1½*d.* answer.

(3) Thus; as $\left\{\begin{matrix}1\text{C.}\\0\text{ m.}\end{matrix}\right\}$: 16,333 :: $\left\{\begin{matrix}17,75\text{C.}\\7,5\text{ m.}\end{matrix}\right\}$: 20,7082*s.* For 16,333×17,75×7,5÷5,25×20=1*l* or 8½*d.* answer.

(4) Thus; as $\frac{1}{3})\frac{417,6}{52,2}$: 5 :: 417,6 : 40. men. acres. men. Then,

2d. Inversely, as 6days : 4omen :: 12days : 2omen. ans.

By a Double stating, the months being inverted.

Thus; as $\left\{\begin{matrix}15,25\ £.\\12,75\text{mo.}\end{matrix}\right\}$: 76,94 :: $\left\{\begin{matrix}6\ £.\\9,5\text{ mo.}\end{matrix}\right\}$: 22,55521£.

For 76,94×6×9,5÷15,25×12,75=22*l* 11*s* 1¼*d.* answer.

(6) Thus; by contraction,

As $\left\{\begin{matrix}1=12\text{oxen}\\1=2\text{odays}\end{matrix}\right\}$: 16,25 acres :: $\left\{\begin{matrix}24\text{oxen}=2\\100\text{days}=5\end{matrix}\right\}$: 162,5 ans.

10 10

Acres 162,50 answer.

(7) Thus; the time inverted, As $\left\{\begin{matrix}3,5\ £.\\1,25\text{ qr.}\end{matrix}\right\}$ £. 100 :: $\left\{\begin{matrix}38,5£.\\1.\quad\text{yr.}\end{matrix}\right\}$ £. 880

For 38,5×100÷1,25×3,5=880£. answer.

(8) By inverse proportion.

Thus; as $\left\{\begin{matrix}6\text{ men}\\12,3\text{ hr.}\end{matrix}\right\}$: 2,5da. :: $\left\{\begin{matrix}9\text{ men}\\8,2\text{ hr.}\end{matrix}\right\}$: 2,5 days.

For 9×8,2×2,5÷6×12,5=2,5 days. Again 22,5×17,3×10,25=3989,8125 feet. And 34,6×45,×12,3=19151,1 feet. Then, as 3989,8125 ft. : 2,5days :: 19151,1 ft. : 12 days. For 19151,1×2,5÷3989,8125=12 days. answer.

THE SQUARE ROOT.

EXAMPLES.

(3) 5499025(2345 root.
4

43)149
129

464)2090
1856

4685) 23425
23425

(4) 74770609(8647 root.
64

166)1077
996

1724) 8106
6896

17287) 121009
121009

(5) ,,,,,
368863,00(607,34092+root.
36

1207) 8863
8449

12143) 41400
by contrac. 36429
division

1214) 4971
,,, 4858

113
109

4
2

2

(6) ,,,,
3271,4007(57,19+root.
25

107) 771
749

1141) 2240
1141

11429)109907
102861

7046

(7) ,,,,,,
2,27109570(1,50701+root.
1

25)127
125

3007) 21095
21049

301401) 0467000
301401

165599

(8) ,,,,
10,000000(3,162277+root.
9

61)100
61

626) 3900
3756

6322) 14400
12644

63242) 1756
1264

492
442

50
44

6

(9) ,,,,,
c00327248 1(,01809 root.
1
28)227
224
3609) 32481
32481

(10) 160,000000(12,649+ root.
1
22)60
44
246)1600
1476
2524) 12400
10096
25289) 230400
227601
2799

(11) Thus; s. d.
30 1
12
,,
361(19 ans.
1
29)261
261

(12) Thus; 1,5×1,5=2,25
And 3,5×3,5=12,25
Then, inversely, as 2,25in. : 300min. :: 12,25in. : 55min. 6sec.
300
675,00÷12,25=55min. 6sec. answer.

(13) ,,
484=22 root.
4
42) 84
84

(14) 17×17=289
20×20=400 +
,,
689(26,2+
4
46) 289
276
522) 1300
1044
256

(15) 36×36= 1296
24×24= —576
,,
720(26,83+
4
46)320
276
528) 4400
4224
5363) 17600
16089
1511

(16) 60×60=3600ft. long. Again 3600ft. long.
37×37=—1369ft. high. 23×23=—529ft. high.

2231(47,23+ft.
16
87) 631
609
942) 2200
1884
9443) 31600
28329
3271

3071(55,41ft.
25
105) 571
525
1104) 4600
4416
11081) 18400
11081
7319

Then, 45,23 } +
55,41 }
answer 102,64 ft. broad.

(17) Com. mea. 761) $\frac{3044}{6849}=\frac{4}{9}$ whose root is $\frac{2}{3}$. answer.

(18) Com. mea. 144) $\frac{7056}{9216}=\frac{49}{64}$ whose root is $\frac{7}{8}$. answer.

(19) $\frac{3168}{6192}$ 3168,0000000
30960

7200
6192

10080
6192

38880
37152

17280
12384

48960
43344

56160
55728

43200
37152
6048

The right quotient.

5116279069(,71528+ Facit.
49
141) 216
141
1425) 7527
7125
14302) 40290
28604
143048) 1168669
1144384
24285

(20) $37\frac{16}{49}=\frac{1849}{49}$ whose root is $\frac{43}{7}=6\frac{1}{7}$ Facit.

(21) $17\frac{16}{25}=\frac{441}{25}$ whose root is $\frac{21}{5}=4\frac{1}{5}$ Facit.

(22) $76\frac{14}{17}$ Thus; 17)14,00000000

76,82352941+(8,7649+answer.

64

167)1282

1169

1746) 11335

10476

17524) 85929

70096

175289) 1583341

1577601

5740

THE CUBE ROOT.

EXAMPLES.

(2) 34328125(325 root.

27

Defect. div. & square of 2=2704) 7328

+180=comp. divisor 2884) 5768

Defect. div. & squ. of 5=307225) 1560125

+4800= com. divisor 312025) 1560125

Or thus; 34328125(325 Cube root.

27

First divisor =2790) 7328

2700×2 = 5400

90×2×2= 360

2×2×2= 8

5768

3×3×300=2700

3×30 = 90

1st. divisor= 2790

2d. Divisor =308160)1560125 | 32×32×300=307200
307200×5 = 1536000 | 32×30 = 960
960×5×5= 24000
5×5×5= 125 | 2nd. Divisor = 308160
1560125

(3) 84604519(439
64
{Defect. divisor & squa. of 3= 4809)20604
{+360=complete divisor 5169)15507

{Defect. divisor & squa. of 9 =554781) 5097519
{+11610=complete divisor 566391) 5097519

(4) 259694072(638
216
{Defect. divisor & square of 3 = 10809) 43694
{+540=complete divisor 11349) 34047

{Defect. divisor & square of 8 = 1190764) 9647072
{+15120=complete divisor 1205884) 9647072

(5) 22069810125(2805
8
{Defect. divisor & squ. of 8=1264)14069
{+480=complete divisor 1744)13952
Defective divisor =2352 117810
{Defect. divis. & squa. of 5=23520025)117810125
{+42000=complete divisor 23562025)117810125

(6) 673373097125(8765
512
{Defect. divisor & squ. of 7=19249)16:373
{+1680=complete divisor 20929)146503
{Defect. divi. & squ. of 6=2270736) 14870097
{+15660=comp. divisor 2286396) 137:8376
{Defec. div. & squ. of 5= 230212825)1151721125
{+131400=com. divisor 230344225)1151721125

(7) 12,97,375(2,35
8

Defect. divisor & square of 3=1209)4977
+180=complete divisor 1389)4167

Defect. divisor & sqr. of 5=158725)810875
+345=complete divisor 162175)810875

(8) ,001,906,624(124
1

Defect. divisor & squ. of 2 = 304) 906
+60=complete divisor 364) 728

Defect. divis. & squ. of 4=43216) 178624
+1440=complete divisor 44656) 178624

(9) 15,926,972,504(25,16+
8

Defect. divisor & squ. of 5=1225)7926
+300=complete divisor 1525)7625
Defec. divi. & squ. of 1=187501) 301972
+750=complete divisor 188251) 188251
Defec. divi. & squ. of 6=18900336)113721504
+45180=complete divi. 18945516 113673096
,48408

(10) 171,467,764,060(5,555+
125

Defect. divi. & squ. of 5=7525)46467
+750=complete divisor 8275)41375
Defec. divi. & squ. of 5=907525)5092764
+8250=comp. divisor 915775)4578875
Defec. divi. & sq. of 5=92417525)513889060
+83250=com. divisor 92500775 462503875
51385186

(11) 12×12×12÷2=864 inches in half a solid foot.
6×6×6=216—do. in half a foot solid.
Then 648÷216=3 half feet. answer,

(12) $12\times12\times12=3720$
$6\times6\times6=216$ = 8 cubes of 6 inches.
Cube inches in 1 foot $=1728$
$3\times3\times3=27$ = 64 cubes of 3 inches. answ.

(13)

1953,125(12,5
1
304) 953
+60 364) 728
43225) 225125
+1800 45025) 225125

(14)

474552(78 root.
343
Defect. divi. & squ. of 8=14764) 131552
+1680=complete divisor 16444) 131552
Then $78\times78=6084$ answer.

(15)

£. s.
691 4
20
13824(24 pieces. answer.
8
Defec. divi. & squ. of 4=1216) 5824
+240=complete divisor 1456) 5824

(16) Common measure $=44\left(\frac{352}{1188}=\frac{8}{27}\right.$ whose root is $\frac{2}{3}$ ans.
(17) Com. measure $=24\left)\frac{648}{3000}=\frac{27}{125}\right.$ whose root is $\frac{3}{5}$ answer.
(18) Thus; $\frac{4}{9})4,000000000$

,444444444+(,763+Fac.
343
Defec. div. & squ. of 6=14736) 101444
+1260=comp. divisor 15996) 95976
Defec. div. & squ. of 3=1732809) 5468444
+6840=comp. divisor 1739649) 5218947
249497

(19) 7)6.000000000

,857142857(,949+

729

Defec. divisor & square of 4 = 24316)128142
+1080=complete divisor 25396)101584
Defec. divisor & squ. of 9=2650881)26558857
+25380=comp. divisor 2676261)24086349

2472508

(20) $13\frac{2}{3}$. Thus; 3)2,000000000000

,13,666666666666(2,3908+

8

Defec. divi. & squ. of 3=1209)5666
+180=comp. divisor 1389)4167
Def. div. & sq. of 9=158781)1499666
+6210=comp. divi. 164991)1484919
Defec. divisor = 171363)14747666
Def. div. & sq. of 8=171363006)14747666666
+575100=co. div. 171420516)137136413312

1034025354

(21) $42\frac{21}{24}=42\frac{7}{8}=3\frac{1}{2}.^3$ whose root is $\frac{7}{2}=3\frac{1}{2}$ answer.

(22) $5\frac{104}{125}=\frac{729}{125}$ whose root is $\frac{9}{5}=1\frac{4}{5}$ answer.

(23) $405\frac{28}{125}=\frac{50653}{125}$ whose root is $\frac{37}{5}=7\frac{2}{5}$ answer.

(24) $7\frac{3}{5})3,0$

,7,600000000(1,996+ans.

1

Defec. divisor & squ. of 9=381)6600
+270=complete divisor 651)5859
Defec. divi. & sq. of 6=108336)741000
+3420=com. divisor 111756)670536
Defec. div. & sq. of 6=11524836)70464000
+35280=com. divi. 11560116)69360696

1103304

(25) 9⅛)1,000000000

9,166666666(2,092+ans.
8

Defec. divisor 12 1166

Defec. divi. & sq. of 9=120081)1166666
+5400=comp. divisor 125481)1129329

Defec. divi. & sq. of 2=13104304)37337666
+12540=comp. divi. 13116844)26233688
11093978

ARITHMETICAL PROGRESSION.

CASE 1.

EXAMPLES.

(2) 16−1=15
4
60
+ 5
65

5+65=70
16=num. of terms.
2)1120
12) 560 *d.*
£,0) 4,6 8

The last term *d.*65=5*s.* 5*d.* answer *£.* 2 6 8=sum rec'd.

(3) 1+100=101 sum of extremes.
50=½ number of terms.
£,0)505,0*s.*
answer *£.* 252 10

(4) 2+2=4 the first term,
and 100×4=400 the last term,
4+400=404 sum of the extremes.
× 50=½ num. of terms.
yds. in a mile=176,0)2020,0(11 miles.
176
260
176
yds. in a furl.=22,0) 84,0 yds.
answer 11m. 3furl 180yds.

(5) 54—1=53
× 3 com. dif.
159
+ 2=1st term.
last term 161*s.*=8*l.* 1*s.*
+ 2
163 sum of extre.

then, 163 sum of extremes.
54÷2= 27=½no. of terms.
1141
326
2,0)440,1
answer £.220 1 whole sum.

(6) 14—1=13
×2
26
+5
£. 31 for the last yr.

then, £. 31 for the last year.
+5
36
14÷2= 7
£. 252 for 14 years.

Then 252÷14=18*l.* annually. ans.

CASE 2.

EXAMPLES.

(2) 48—3=45 last term, less the first; and 45÷10—1=5 common difference. answer.

(3) 60—20=40 and 40÷21—1=2 com. diff. answer. Then 20=the age of the first; and 20+2=22 ditto of the second &c. &c.

(4) 60—6=54 and 54÷19—1=3 miles common difference. Then, 60+6=66
× 19
1254÷2=627 miles, answer.

GEOMETRICAL PROGRESSION.

EXAMPLES.

(2)
1 2 3 4 5
2, 4, 8, 16, 32
×32
64
96
1024=1st power of the ratio.

continued,

1024=10th power of the ratio.
× 1024
1048576=20th ditto
× 1024
1073741823=30th ditto, less by 1
× 2 equal 1st. term.
12)2147483646 *d.*
2,0)178956970 6
3,0)8947848 10 6=amount.
answer £. 298261 12 4=per bushel.

(3) 1 2 3 4 5
2, 4, 8, 16, 32
× 32
1024=10th power of ratio.
× 32
2,0)3276,7=15th ditto less 1
answer £. 1638 7*s.*

(4) 1 2 3
4, 16, 64=3d. power of the ratio.
× 64
4096=6th ditto.
× 4096
4—1=3)16777215=12th ditto, 1 deducted.
4)5592405 qrs.
12)1398101¼
2,0)11650,8 5¼
£. 5 25 8 5¼ sold for
12×4=—48 0 0 bought for
answer £.5777 8 5 gained.

(5) 1 2 3 4 4+4= 8
2, 4, 8, 16,=4th pow. of ra.; &16×16=256=8th do.
8 + 8
256×256 = 65536=16th do.
×65536
4)4294967295=32d. 1 subt.
12)1073741823¾
2,0)8947848,5 3¾
answer £. 4474924 5 3¾

(6) 1 2 3 4 5
3, 9, 27, 81, 243 = 5th power of the ratio.
5 + 5 = 10.
and 243 × 243 = 59049 = 10th ditto.
× 59049
3—1=2)3486784400 = 20th do. 1 deducted
1743392200
× 4 = first term.
barley cor. in apt. = 768,0 6973568800
pints in a bushel = 64) 908016 } rejecting,
2s 6d. = ½) 14187 } remainders.
answer £. 1773 7 6

(7) 1 2 3 4 5 5 + 5 = 10
3, 9, 27, 81, 243 and 243 × 243 = 59049 = 10th power of ratio.
10 + 10 = 20
Then, 59049 × 59049 = 3486784401 = 20th ditto.
× 59049
1,00)205891132094 6,48 = 30th do. 1 deduct.
4)205891132094 6 qrs.
12)51472783023 6½
2,0)4289398585,3 0½
£. 2144699292 13 0½ amount.
50£. × 30yds. = — 1500 0 0 deduct.
answer £. 2144697789 2 13 0½ gained.

(8) 1 2 3 3+3 = 6
2, 4, 8 and 8 × 8 = 64 = 6th power of the ratio.
× 64
4095 = 12th do. 1 subtracted.
× 21 = shillings in a guinea.
4095
8190
2,0)8599,5 shillings.
answer. £. 4299 15

SIMPLE INTEREST BY DECIMALS.

EXAMPLES.

£. s. Princi. time. rati. interest £. s. d.

(2) 917 16=917,8×7×,05=321,23=321 4 7,2 answer.

£. s. Princi. ratio. commission £. s. d.

(3) 391 17=391,85 which×,045=17,63325=17 12 7,98

(4) 567*l.* 10.=567,5 Principal.
9×,06= ,54 Time and ratio.

£. s.
£. 306,450=306 9= Interest.
\+ 567 10= Prin. } answer.
£.873 19= amount.

(5) 4726*l* 18*s* 6½*d.*=4726,92708£. Princi.
3,5×.07= ,245 time and ratio.

£. s. d.
Product=£. 1158,09713560=1158 1 11,3= Inter.

(6) 9526*l.* 12*s.* 9*d.*=9526,6375=Principal.
12,75×,07 = ,8925 time and ratio.
Product=£.8502,52397875=Interest.
\+ 9526,6375 = Principal.
answer £. 18029,16147875=Amt.=18029*l.* 3*s.* 2¾*d.*

ALLIGATION.

CASE 1.

EXAMPLES.

C.wt. *s.* *s.*

(2) Thus; 2 at 56=112 } By the rule of three direct
1 at 43= 43 } +
2 at 50=100

Then, as 5 : 255 :: 3C.wt. : 7*l.* 13*s.* answer.

(3) Thus; 4 oz. at 5*s.*=20*s.*
8 oz. at 4*s.*=32*s.*

Then, as 12 : 52 :: 1 oz. : 4*s.* 4*d.* answer.

(4) Thus;

Gal.	*s.*	*d.*	*d.*
12 at	4	10	= 696
24 at	5	6	=1584
16 at	6	$3\frac{1}{4}$	=1204

gal. *d.* *s.* *d.*

Then; as 52 : 3484 :: 1 : 67=5 7 answer.

(5) Thus;

oz.	Car.	Car.
8 of	22	176
1lb. 8 oz.=20 of	21	420
10 of	18	180

oz. Car.

Then, as 38 : 776 :: 1 : $20\frac{8}{19}$ answer.

(6) Thus;

lb.	oz.	oz.
5 of	8	=40
10 of	7	=70
15 of	6	=90

lb. oz.dwt.gr.

Then, as 30 : 200 :: 1 : 6 3 8 answer.

CASE 2.

EXAMPLES.

(2) Mean rate 18 { 24, 16, 12 } 2+6=8 qts. of Canary, 6 Sherry, 6 Malaga. } answ.

(3)

1st. M. R. { 12, 11, 9, 8 } 10 — 2 at 12, 1 at 11, 1 at 9, 2 at 8

2d. M.R. { 12, 11, 9, 8 } 10 — 1+2=3 at 12, 2 at 11, 2 at 9, 1+2=3 at 8

	lb.	*s.*
3rd. M.R. { 12, 11, 9, 8 } 10	1 at	12
	2 at	11
	2 at	9
	1 at	8

4th M. R. { 12, 11, 9, 8 } 10 — lb. *s.*: 1 at 12, 1+2=3 at 11, 1+2=3 at 9, 1 at 8

	lb.	*s.*	
5th. M. R. { 12, 11, 9, 8 } 10	2	=	2 at 12
	1 add 2	=3	at 11
	1	=	1 at 9
	1 add 1	=3	at 8

6th. M. R. { 12, 11, 9, 8 } 10 — lbs.: 2add1=3, 1add2=3, 1add2=3, 2add1=3

3 lbs. of each, answer.

(4) M. R. 7 — 4, 6, 11 — 4 = 4, 4 = 4, 3+1=4 — answer 4 of each sort.

(5) M. R. 4 — 3, 5, 7, 0 — s. 1 at 3, 1 at 5, 4 at 7, 3 of water, answer.

CASE 3.

Examples.

(2) M. R. 22 — 30, 36, 48, 18 — 4, 4, 4, 26+14+8=48 — Against the price of the given quantity stands 48. Therefore,

As 48bu : 4bu. :: 12bu. : 1bu. of each sort. Answer.

(3) M. R. 22 — 16, 20, 24, 18, 0 — 2, 2, 2+4+22+6=34, 2, 2 — Against the given quantity stands 2, consequently the quantity for 16, 20 & 0 will be 10 oz.

Then, as 2 oz. : 34 oz. :: 10 oz. : 170 oz. answer.

(4) M. R. 28 — 48, 36, 24, 12 — 16, 4, 8, 20 — Against the price of the given quantity. bu. p.

Then, as 16 : 4, 8, 20 :: 10 : 2 2, 5 0, 12 0 — 1st. ans.

M. R. 28 — 48, 36, 24, 12 — 4, 16, 20, 8 — Against the price of the given quantity.

Then, as 4 : 16, 20, 8 :: 10 : 40, 50, 20 — 2d. ans.

M. R. 28 — 48, 36, 24, 12 — 4+16=20, 16, 20, 8+20=28 — Against the price, &c. bu.

As 20 : 16, 20, 28 :: 10 : 8, 10, 14 — 3d. ans.

M. R. 28 — 48, 36, 24, 12 — 16+4=20, 16+4=20, 20+8=28, 20+8=28 — Against the price &c. bu.

As 20 : 20, 28, 28 :: 10 : 10, 14, 14 — 4th. ans.

M. R. 28 — 48, 36, 24, 12 — 16, 4+16=20, 8, 8+20=28 — Against the price, &c. bu.p.

As 16 : 20, 8, 28 :: 10 : 12 2, 5 0, 17 2 — 5th. ans.

M. R. 28 {48, 36, 24, 12} | 16+4=20, 4, 20+8=28, 20 | Against the price, &c. As 20 { : 4, : 28, : 20 } :: 10 { : 2, : 14, : 10 } bu. 6th ans.

M. R. 28 {48, 36, 24, 12} | 4, 4+16=20, 8+20=28, 8 | Against the price, &c. As 4 { : 20, : 28, : 8 } :: 10 { : 50, : 70, : 20 } bu. 7th ans.

CASE 4.

EXAMPLES.

(2) M. R. 6 {4, 5, 8} | 2, 2, 2+1=3 | Then, as lb. 7 : lb. 21 :: { lb. 2 : lb. 6 at *s.* 4, 2 : 6 at 5, 3 : 9 at 8 } 1st ans.

Sum of the difference = 7

M. R. 7 {4, 5, 8} | 1, 1, 3+2=5 | Then, As lb. 7 : lb. 35 :: { lb. 1 : lb. 5 at *s.* 4, 1 : 5 at 5, 5 : 25 at 8 } 2d. ans.

Sum of the differ. = 7

(3) M. R. 16 {8, 12, 18, 22} | 6, 2, 4, 8 | As lb. 20 : lb. 120 :: { 6 : 36, 2 : 12, 4 : 24, 8 : 48 } answer.

Sum of diff. = 20

(4) M. R. 33 {48, 0} | 33, 15 = 48 | Then, as gal. 48 : gal. 80 :: { gal. 33 : gal. 55, 15 : 25 } ans.

(5) M. R. 18 {15, 17, 20, 22} | 4, 2, 1, 3 = 10 | Then, as Car. 10 : Car. 40 :: { 4 : 16 at 15, 2 : 8 at 17, 1 : 4 at 20, 3 : 12 at 22 } ans.

Q

SINGLE POSITION.

EXAMPLES.

(2) Suppose A's age 20
Then B's 30
and C's 60
Sum 110

As 110 : 132 ::
20 : 24 A's age
30 : 36 B's
60 : 72 C's
Proof 132

(3) Suppose 100 ÷ $\frac{1}{4}=25$, $\frac{1}{5}=20$, $\frac{1}{6}=16\frac{2}{3}$, $61\frac{2}{3}$ Then, as $61\frac{2}{3}$: 74 :: 100 : 120 answer.

(4) Suppose 250*l.* whose interest for 10 yrs. = 150*l.* and 150*l.* + 250*l.* = 400*l.* Therefore, as 4,00*l.* : 5,00*l.* :: 250*l.* : 312*l.* 10*s.* answer.

(5) Suppose 20 min.
of an hour 20 min. = $\frac{1}{3}$ 54)162 com. denominator.
of 2 hours 20 = $\frac{1}{6}$ 27
of 3 hours 20 = $\frac{1}{9}$ 18
$\frac{99}{162}=\frac{11}{18}$

Then, as 11 parts : 20 min. :: 18 parts : 32 min. $43\frac{7}{11}$ sec. ans.

(6) Suppose 90*l.* Thus; 90 ÷ $\frac{1}{3}=30$, ÷ $\frac{1}{4}=22\frac{1}{2}$, ÷ $\frac{1}{6}=15$, $67\frac{1}{2}$
From 90
Take $67\frac{1}{2}$
$22\frac{1}{2}$

Then, as $22\frac{1}{2}$*l.* : 28*l.* :: 90*l.* : 112*l.* answer.

(7) Suppose 45 and $45\times3\div5=27$ which $\times7=189$
$45\times2\div3=30+$
219

Then, as 219 : 292 :: 45 : 60 years. answer

(8) Suppose 100

$\frac{1}{3}$	$33\frac{1}{3}$
$\frac{1}{4}$	25
$\frac{1}{5}$	20
Sum	$78\frac{1}{3}$

Then, as $78\frac{1}{3}$: 100 :: 94 : 120 answer.

(9) Suppose 600, whose interest for 12 yrs. = 432 and 600 + 432 = 1032: Then, as 1032 : 600 :: 860 : 500*l.* answer.

(10) Suppose 80

$\frac{1}{3}$	$26\frac{2}{3}$
$\frac{1}{4}$	20
$\frac{1}{5}$	16
$\frac{1}{6}$	$13\frac{1}{3}$
Sum	76

Then, as 76 : 80 :: 57 : 60 answer.

(11) Suppose 100 scholars.

2		Sch.	Sch.	Sch. Sch.
$\frac{1}{2}$ | 200	Then, as	$308\frac{1}{3}$:	333 ::	100 : 108
$\frac{1}{3}$ | 50		3	300	3
$\frac{1}{4}$ | $33\frac{1}{3}$				
25		925		300
$308\frac{1}{3}$				99900÷925=108 ans.

(12) Suppose 90*l.* Then $90\div\frac{1}{3}=30$ & $90-30=60l.$ A lays out: and $60\times 2=120$ B lays out; then $120-90=30$ which should be 50. Therefore, as 30*l.* : 50 :: 90*l.* : 150*l.* answer.

(13) Suppose 120,00*l.*

6	$\frac{1}{10}$)	1200,0
720,00		600
—600	Then, as	120*l.* : 100 :: 12000*l.* :
£. 120		10000*l.* answer.

DOUBLE POSITION.

EXAMPLES.

(2) 1st. Sup. A had 15*l.* 2d. Sup. A had 25*l.*
Then, $15\times 2-8=22$B. then, $25\times 2-8=42$B.
and $15\times 3-15=30$C. and $25\times 3-15=60$C.

$100-67=33$ defect. $127-100=27$ (Excess.

$15\times 27=405$
$25\times 33=825$
Sum 60)1230

£.	s.		
20	10	20 10*s.*	A's part
20	10×2—	8=33 0	B's do.
20	10×3—	15=46 10	C's do.
		Proof £. 100	

(3) 1st. sup. A paid 12 2d. Sup. A paid 16
Then $12+10=22$ B. Then $16+10=26$
and $12+22=34$ C. and $16+26=42$

$100-68=32$ defect. $100-84=16$ defect.

continued,

Then, $16\times32=512$
$12\times16=192$
Differ. 16) 320
A paid £. 20

A paid $=20l.$
B $20+10=30$
C $20+30=50$
} answer.
Proof. £. 100

(4) 1st. sup. C's age 70
Then, $70\div2+20=55$ B's
and 20 A's
75
$75-70=5$ defect.

2d. sup. C's age 90
then $90\div2+20=65$ B's
and 20 A's
85
$90-85=5$ Er. of exc.

Therefore $70\times5=350$
$90\times5=450$
Sum 1,0) 80,0
answer C's age =80 yrs.

From C's=80
$80\div2+20=60$ B's
add 20 A's
Take B & A's=80
remains 0 the Proof.

(5) 1st. Sup. the body 30 inches.
Then, $30\div2+9=24$ tail.
9 head.
$33-30=3$ def.
Therefore, $30\times2=60$
$40\times3=120$
Sum 5) 180
Leng. of the body=36 inches.

2d. Sup. 40 inches.
$40-2+9=29$
9
$40-38=2$ excess
36in.=body.
$36\div2+9=27$=tail.
9 =head.
Whole length 72 in.=6ft. ans.

(6) 1st. Suppose he worked 20 days.
Then 20 at $20d.=400d.$
and 20 idle at $10d=200-$
$2l.$ 1s. $8d.=500d-200=300$ Defect.
Therefore $25\times300=7500$
$20\times150=3000$
Difference 15,0) 450,0
answer, he worked 30 days.

2nd. Suppose 25 days at work.
Then 25 at $20d.=500$
and 15 idle at $10d.=150-$
$500-350=150$ defect.

continued.

For 30days at 20*d.*=600*d.*
10days at 10*d.*=100—
Proof. 500*d.*=2*l.* 1*s.* 8*d.*

(7) 1st. Suppose 4 of Damask. 2nd. Suppose 6 of Damask.
Then 4 at 8*s.*=32*s.* Then 6 at 8*s.*=48
and 11 at 3*s.*=33 and 9 at 3*s.*=27
3*l.* 10*s.*=70*s.*-65=5 defect. 75-70*s*=5 exc.
Therefore, 4×5=20 For 5yds. at 8*s.*=40
6×5=30 and 10 at 3*s.*=30
Sum 10)50 Proof 70*s*=3*l* 10*s*.

answer 5 yds. of damask and 10 of lining.

(8) Sup. 1st. $\frac{1}{4}$)400*l.* and 400 2d. Sup. 500*l.* and 500
+100 —225 —225 $\frac{1}{4}$=125
500 175 275 625
—350 × 2 × 2 —550
Defect. 150 350 550 defec.=75
Then, 500×150=75000
400× 75=30000
75)45000(600*l.* answer.

(9) 1st. Suppose the man 42, $\frac{1}{3}$ of which is 14 for the wife.
14+15×2=58 2d. Sup. 48 + 15=63
42+15= —57 of which $\frac{1}{3}$=16&16+15×2=62
Error of excess 1 Error of defect. 1
Then, 42 1 42 45+15=60 his age when 15yrs. married.
48 1 48 15+15=30 his wife's do. do.
2)90 30=difference.

The husband 45 yrs. old. and the wife 15, answer. } As 8yr. : 16yr. :: 30yr. : 60yr. Proof.

PERMUTATION.

EXAMPLES.

(2) 1×2×3×4×5×6×7×8×9×10×11×12=
479001600 Changes.
×3

6,0)143700480,0 sec.

6,0)2395008,0

6)399168 hrs.

quar. of da.=66528 dividend.

365¼ days=1461qrs. Divis.
1461)66528(45yrs. 195da. 18hr.
5844 answer.

8088
7305

4)783

195¾ da.=195 days. 18 hrs.

(3) 1×2×3×4×5×6×7×8=40320 changes, or days.
Then 40320×4=161280
——— $=110\frac{570}{1461}$yrs.=110yrs. 142days.
365×4+1=1461 answer.

(4) 1×2×3×4×5×6×7×8×9×10×11×12×13=
6227020800, which ×14×15×16×17×18×19×20
21×22×23×24×25×26=403291461126605635584000000 answer.

COMBINATION.

EXAMPLES.

(2) $\frac{24\times23\times22\times21\times20\times19\times18\times17\times16\times15\times14\times13}{1\times2\times3\times4\times5\times6\times7\times8\times9\times10\times11\times12}$=
2704156 pence.=11267*l.* 6*s.* 4*d.* answer.

(3) $\frac{100\times99\times98\times97\times96\times95\times94\times93\times92\times91\times90}{1\times2\times3\times4\times5\times6\times7\times8\times9\times10\times11}$

$\frac{\times89\times88\times87\times86\times85\times84\times83\times82\times81\times80\times79}{\times12\times13\times14\times15\times16\times17\times18\times19\times20\times21}$

continued,

$$\frac{\times 118\times 117\times 116\times 115\times 114\times 73\times 112\times 71\times 110\times 69}{\times 22\times 23\times 24\times 25\times 26\times 27\times 28\times 29\times 30\times 31}$$

$$\frac{\times 68\times 67\times 66\times 65\times 64\times 63\times 62\times 61\times 60\times 59}{\times 32\times 33\times 34\times 35\times 36\times 37\times 38\times 39\times 40\times 41}$$

$$\frac{\times 58\times 57\times 56\times 55\times 54\times 53\times 52\times 51}{\times 42\times 43\times 44\times 45\times 46\times 47\times 48\times 49\times 50} =$$

DUODECIMALS.

ADDITION.

EXAMPLES.

Facit 314ft. 3in 6″ 4‴ 9⁗

(1)

Ft.	in.	″
1295	9	8
1295	9	8
1295	9	8
1295	9	8
1295	9	8
answer 6479	0	4

(2)

Ft.	in.
27	3
25	11
23	10
20	9
20	6
18	5
Ft. 136	8in. answer.

SUCTRACTION.

EXAMPLES.

Ft.	in.	″	‴	⁗	
2799	1	1	11	10	Facit.

(2)

Ft.	in.	
From 41	7	
Take 19	10	
answer ft. 21	9	

MULTIPLICATION.

CASE 1.

EXAMPLES.

(2) Multiply Ft. 28 in. 10 ″ 6

By 3 2 4

0	9	7	6	0
4	9	9	0	
86	7	6		

answer feet=92 2 10 6 0

CASE 2.

EXAMPLES.

(2) Mul. ft. 82 in. 6 by ft. 13 in. 3
12+1=13ft.

	990	0	
In. 3=¼	82	6	
	20	7	6″
answer	1093	1	6

(3) Mul. ft. 79 in. 8×2
By 6×6+2=38

	478	0	
		6	
	2868	0	
In.	159	4	
6=½	39	10	
4=⅓	26	6	8″
1=¼	6	7	8
Facit	3100	4	4 answer.

(4) Mul. ft. 59 in. 9
By 4×6=24

	239	0	
6in.=½		6	
	1434	0	
	29	10	6
9	1463	10	6

yds. 162 5ft.+ans.

(5)
$$\frac{21,5\times17,5}{1,5\times1,5}=\frac{376,25}{2,25}=167+\text{ans.}$$

PROMISCUOUS QUESTIONS.

(1) 47 — 21 = 26 A's age; 21 + 60 = 81 B's.
answer.

(2) 25×2=50
5×2+20=30—
answer 20=the differ.

(3) Thus; 35 — 30 = As 1 day : 5 :: 7days : 35M. 65×7=45 5m. answer.
35 + 30 =

(4) Thus; As 2.5£. : 100£. :: 22.5£. : 900£. answer.

(5) A, B & C = 350£.
B, C & D = 345
C, D & A = 400
D, A & B = 378
Num. combined = 3,1473

Then,

491 − 345 = 146 A's.
491 − 400 = 91 B's.
491 − 378 = 113 C's.
491 − 350 = 141 D's.
Proof. £. 491

answer.

A, B, C & D = 491£. whole sum.

(6) 10*s.* 6*d.* = 10.5*s.* which ÷ 3 = 3.5*s* gain; and 10.5*s.* − 3.5*s.* = 7*s.* first cost. Then say, as 7*s.* : 3 5*s.* :: 100£. : 50£. = gain per cent, and 12*s.* − 7*s.* = 5*s.* as 3 5*s.* : 50£. :: 5*s.* : 71£. 8*s.* $6\frac{9}{7}$*d.* per cent. answer.

(7) $\frac{2}{3}$ of $\frac{3}{8} = \frac{6}{24} = \frac{1}{4}$. Therefore, as 1 part : 1260*l.* :: 4 parts : 5040£. answer.

(8) 275£. − 250£. = 25£. gain.

As 250*l.* in 3 mo. ▷ 25£. ◁ 100*l.* in 12 mo. ▷ 40£.

For 100 × 12 × 25 ÷ 250 × 3 = 40£. answer.

(9) 3500 − 2500 £. 1000

As 25,00 in 8 yrs. ▷ 1000*l.* ◁ 1,00*l.* in 1yr. ▷ 5£

For 1000 ÷ 25 × 8 = 5*l.* per cent. answer.

(10)

mo.	*l.*	
6 = $\frac{1}{2}$	—	
3 = $\frac{1}{2}$	2 10	
	1 5	
	3 15	
	100 0	
	103 15	

As 103*l.* 15*s.* : 100*l.* :: 200*l.* : 192*l.* 15*s.* $5\frac{5}{8}\frac{5}{3}$*d.* And 192*l.* 15*s.* $5\frac{5}{8}\frac{5}{3}$*d.* − 150*l.* = 42*l.* 15*s.* $5\frac{5}{8}\frac{5}{3}$*d.* answer.

(11) First, Suppose 4 o'clock; then 12 − 4 = 8 remains, and $\frac{4}{5}$ of $\frac{8}{1} = \frac{32}{5} = 6.4$. Then 6.4 − 4 = 2.4 Error of defect: 2d. Suppose 5 o'clock; 12 − 5 = 7 remains, and $\frac{4}{1}$ of $\frac{7}{1} = \frac{28}{5} = 5.6$; then 5.6 − 5 = .6 Error of defect. Therefore,

5 × 2.4 = 12.
4 × .6 = 2 4

differ. 1 8) 9 6) 5.333 + = 5hr. 20min. time required. ans.

(12) First, 12 − 1 = 11 the difference of velocity between the hour and minute hands. Then say, as 11 : 1 :: 12 × 4 : $4\frac{4}{11}$ hr. or $21\frac{9}{11}$ min. past 4. answer.

(13)

Gal.	*s.*	*d.*	*s.*
12 at 6	4	= 76	Then, as 168qts. : 200*s.* :: 1qt. :
18 at 4	10	= 87	$1\frac{4}{21}$*s.* and as 100*l.* : 110*l.* :: $1\frac{4}{21}$*s.*
12 at 3	1	= 37	: 1*s.* $3\frac{5}{7}$*d.* per qt. answer.
Gals. 42		= 168qts.	200*s.*

(14) Thus, inversely, as 5yr. 5mo. : 210*l.* 3*s.* :: 3yr. 3mo.
Or, As 65mo. : 4203*s.* :: 39mo. : 7005*s.*=350*l.* 5*s.*
For 4203×65÷39=7005*s*,=350*l.* 5*s.* answer.

(15) Take 50*l.* and say, inversely, as 100*l.* : 5yr. :: 50*l.* : 10yr. In 10 years 50*l.* will gain 22*l.* 10*s*; but to find in what time 50*l.* will gain 50*l.* say, as 22*l.* 10*s.* : 10yr. :: 50*l.* : $24\frac{4}{4}\frac{6}{1}$ yrs. answer.

(16) 350Prin.×4÷100=14*l.*=interest for 1 year.
4×8=32*l.* 8
+ 100
112*l.*=ditto. for 8 yrs.
As 132 : 32*l.* : : 350 : 84*l.* $16\frac{32}{33}$*s.* rebate.
Then 112*l.*–84*l.* $16\frac{32}{33}$*s.*=27*l.* $3\frac{1}{33}$*s.* in favour of interest. ans.

(17) 100*l.*+20*l.*=120*l.* Then, as 50*s.* : 120*l.* :: 45*s.* : 108*l.* and 108*l.*—100*l.*=8*l.* per cent. gain. answer.

(18) First, 100–17=83*l.* and 100+20=120*l.* Then say, as 83*l.* : 63*l.* :: 120*l* : 91*l.* 1*s.* $8\frac{20}{83}$*d.* And 91*l.* 1*s.* $8\frac{20}{83}$*d.*—63*l.*=28*l.* 1*s.* $8\frac{20}{83}$*d.* answer.

(19) $\frac{1}{3}$|4*d.*
$\frac{1}{4}$|$1\frac{1}{3}$ .. 2(6 com. divi.
|$0\frac{4}{6}$ 4
+1
answer 2 pence.

(20) 6×12×12=864=6 doz. doz.
6×12=–72=$\frac{1}{2}$ doz. doz.
answer 792 difference.

(21) Ratio involved to the 11th power=1.898298=$\overline{1.06}|^{11}$
amount of 1*l.* for 6 months=1.029563+
From the product=1.954417
Take unit 1.
Ratio 1.06—1=.06).9544170
15.90695=quotient.
× 50 Annuity.
multiply 795.34750=amt. yr. paymt.
by 1.022257
813.049459+*£.* do. qr. do.=
(813*l.* 1*s.* ans.

(22) Multiply 167.877
by .06 ratio less unity.
Annuity=20)10 07262

continued,

To the quotient .503631
add 1.

$\overline{1.06}|^{7} = 1.503630 = 7$ yrs. the answer.
1.503631

(23) $\overline{1.05}|^{12} = 1.7958563)365.0000000$
—203.2456605 quotient.

Ratio 1.05—1=.05)161.7543395
3235.08679*l.* in ann. paym
× 1.018559 tabular num.
3295.1267+

Then 3295.1267*l.*—3000*l.*=295*l.* 2*s.* 6¼*d.* better the an ity, answer.

(24) First, Suppose 100. Then 100÷2=50&50+15=
100÷3=33⅓+10=43⅓
and 100—65=35—
Error of defect 8⅓

2nd. Suppose 120
Then 120—2=60+15=75
120÷3—10=50
120—75=45—
Error of defect 5

Therefore
120×8⅓=1000
100×5 = 500
difference 3⅓) 500
3 3
thirds 1,0)150,0

answer 150 menber

(25) $\overline{1.05}|^{15} = 2.0789281)500.0000000$=Annuity.
—240.5085582 quotient.
1,05—1=.05)259.4914418
5189.82883=pres. worth.
500÷2.0789281×.05=4810.17116=reversion.
£. s. d.
The term is better by=£.379.65767=379 13 1¾

(26) $\overline{1.06}|^{3} = 1.191016$ 2000.000000
1679.23856 Present wort
3.0255995×.06=.18153597×
—1
2.0255995)304 842200851
£. s. d.
£. 150.4948+£.=150 9 10¾

(27) $\overline{1.05}|^7 = 1.4071004$ 200.00000 Annuity.
— 142.13626 quotient.
1.05—1=.05) 57.86374
1157.2748 Present worth.
+650
Value of A's offer=1807.2748 £.

$\overline{1.05}|^7 = 1.4071004$)300.00000 Annuity,
—213.2044 quotient.
105—1=.05) 86.79560
1735.912
+150
Value of B's offer=1885.912
do. of A's =1807.2748

£. s. d.
B's offer better by 78.6372£.=78 12 9 answer.

(28) First, Suppose 8 Beggars, then $\overline{8\times3}-8=16$, and $16\div8=2$, and nothing over, so the defect is 3.
2nd. Suppose 9 Beggars, then $\overline{9\times3}-8=19$ and $19\div9=2$ and 1 over, which should be 3, so the defect is 2.
Therefore $9\times3=27$
$8\times2=16$
1) 11(11 Beggars, answer.
For $11\times3-8=25$
and $25\div11=2$*d.* each, and 3*d.* over. Proof.

(29) Answer $99\frac{0}{9}$. For $99\frac{0}{9}=\frac{900}{9}=100$

(30) Let the principal be 50*l.* and $50\times2=100$*l.* Amount, and $100-50=50$ Interest, then
$50\times.06=3.00$)50
16.6666 yrs,=16 yrs. 8mo. answer.

(31) Let the principal be 50*l.* and $50\times2=100$*l.* Amount, and $100\div50=2$, the quotient.
Tabular numbers { 2.0121964 / 1.8982985— 2.0000000 quotient.
—1.8982985=11 years.
.1138979 : 1 yr. :: .1017015 : .8929 yrs,
answer 11.8929 years.

(33) ——|30
1.04|=3.2433975×.04=.129735900
× 50000000
Divisor 2.243975)6486795000000000
answer 2891505*l.* Annuity.

(35) 8*s.* $11\frac{1}{4}$*d.*=429qrs.
——=39 Scholars, answer.
$2\frac{3}{4}$*d.*= 11

(36) $\frac{1}{2}$)360
$69\frac{1}{2}$
3240
2160
180
2,0) 2502.0
$365\frac{1}{4}$ 1251
4 4
1461) 5004(3yrs. $155\frac{1}{4}$da. ans.
4383
4)621
$155\frac{1}{4}$ days.

(37) 5*l.*
100
l. *l.* *l.* *s.* *d.*
As 105 : 100 :: 74.9 : 71 6 8
100
105)7490.0(71 6 8 ans.

(38) 100×$3\frac{1}{4}$= 325
150×$4\frac{1}{2}$= 675
204×$5\frac{3}{4}$=1173
—— —— mo. days.
454) 2173(4 $23\frac{268}{454}$
1816
——
357, &c.

(39) Thus; As 16 parts : 1400*l.* :: 3 parts : $262\frac{1}{2}$*l.*
3
4200÷16=262*l.* 10*s.* answer.

(41) Stated thus; As $\frac{3}{4}$: $7\frac{3}{5}$ $\frac{38}{5}$ :: $\frac{8}{7}$: $6\frac{18}{35}$E.E.
For $\frac{3\times38\times8}{4\times5\times7}=\frac{912}{140}=6\frac{18}{35}$ E.E.
Then inversely, As 5 : $6\frac{18}{35}$ :: 4 : 8yds. oqr. $2\frac{2}{7}$na. ans.

(42) $7\frac{1}{3}=\frac{22}{3}$ and $8\frac{4}{5}=\frac{44}{5}$ Then,
As $\begin{cases} 22 : 1 \text{ work} :: 3 : \frac{3}{22} \\ 44 : 1 \quad :: 5 : \frac{5}{44} \end{cases}$ .. 132 968 common denomina.
Therefore, as 242 parts : 1w. :: 968 parts : 4 hours. ans.

(43) $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{6}$ are $=\frac{6+3+2}{12\ 12\ 12}=\frac{11}{12}$
and $\frac{12}{12}-\frac{11}{12}=\frac{1}{12}=60+40=100$ trees. Then, as $\frac{1}{12}$: 100 trees :: $\frac{24}{24}$: 1200 trees. answer.

(44) $\frac{4}{5}$ of $\frac{2}{5}=\frac{10}{40}=\frac{1}{4}$ Therefore, as $\frac{1}{4}$: 375 :: $\frac{4}{4}$: 1500*l.* ans.

(45) $\frac{4}{7}$ of $\frac{4}{8}$ of $\frac{4}{5}=\frac{60}{280}=\frac{6}{28}$, and $\frac{2}{9}$ of $\frac{7}{8}$ of $\frac{13}{13}$ of $\frac{1000}{1}=\frac{7000}{39}$*l.*

Then as $\frac{6}{28}$: $\frac{7000}{39}$ :: $\frac{28}{28}$, or, $\frac{6\times 7000\times 28}{28\times 39\times 28}=837£.$

12*s.* $1\frac{25}{39}$*d.* the cost of the ship. And 1000*£.*+837*£.* 12*s.* $1\frac{25}{39}$*d.*=1837*£.* 12*s.* $1\frac{25}{39}$*d.* answer.

(46) Thus; as 7 : 1560 :: 12

12

7)18720

$\frac{2}{8}=\frac{1}{4}$ | 2674 $\frac{2}{7}$

$5\frac{3}{8}$

$\frac{4}{8}=\frac{1}{2}$ | 13371 $\frac{3}{7}$ .. 24(56 common. denomina.

668 $\frac{16}{28}$ .. 32

334 $\frac{10}{56}$ .. 16

$\frac{1}{5}$)14374 $\frac{2}{7}$

479 $\frac{3}{7}$

£. 19165 $\frac{5}{7}$=19165*l.* 14*s.* $3\frac{3}{7}$*d.* answer.

(47) $\frac{16}{16}-\frac{5}{16}=\frac{11}{16}$ and $\frac{4}{5}$ of $\frac{5}{6}$ of $\frac{11}{16}=\frac{165}{384}=\frac{55}{128}$; Then the fractions are $\frac{11}{16}$ and $\frac{55}{128}$ which brought to a com. denom. are $\frac{1408}{2048}$ and $\frac{880}{2048}$, then $\frac{1408}{2048}-\frac{880}{2048}=\frac{528}{2048}=537£.$ Therefore, as 528 parts : 537*£.* :: 2048 parts : 2082*£.* 18*s.* $2\frac{2}{11}$*d.* answer.

(48) Thus; as 7da. : 1work :: 1da. : $\frac{1}{7}$work, and as 12da. : 1work :: 1da. : $\frac{1}{12}$work; Then $\frac{1}{7}=\frac{12}{84}$ and $\frac{1}{12}=\frac{7}{84}$, and $\frac{12}{84}+\frac{7}{84}=\frac{19}{84}$ Therefore, as 19parts : 1da. :: 84parts : $4\frac{8}{19}$ days, answer.

(56) $\frac{2}{5}=\frac{14}{35}$ and $\frac{3}{7}=\frac{15}{35}$. Then $\frac{14}{35}+\frac{15}{35}=\frac{29}{35}$, and $\frac{35}{35}-\frac{29}{35}=\frac{6}{35}$ =C's part:

Now, as $\left\{\begin{array}{l}\text{6parts : 256}l.\\ \end{array}\right.$ :: $\left\{\begin{array}{l}\text{14 parts : 597}\frac{1}{3}£.\text{ A put in.}\\ \text{15 parts : 640 B put in.}\end{array}\right.$

(57) 35×35=1225 square of the line,

27×27=729 square of the river's breath,

496(22.271yds,=22yds. $9\frac{3}{4}$+in. answer.

4

42)96

84

12, &c.

(60) In the ball's ascent it occupies 6 seconds or half the time. $12-6=6$, then $6\times4=24$ and $24\times24=576$ feet. answer.

(61) $484(22+4=5\frac{1}{2}$ seconds, answer.

$$\begin{array}{r} 4 \\ \hline 42)84 \\ \quad 84 \end{array}$$

FINIS.

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